STANLEY® Security

BEST A2 & A4 Keys System Training





BEST Interchangeable Core Types



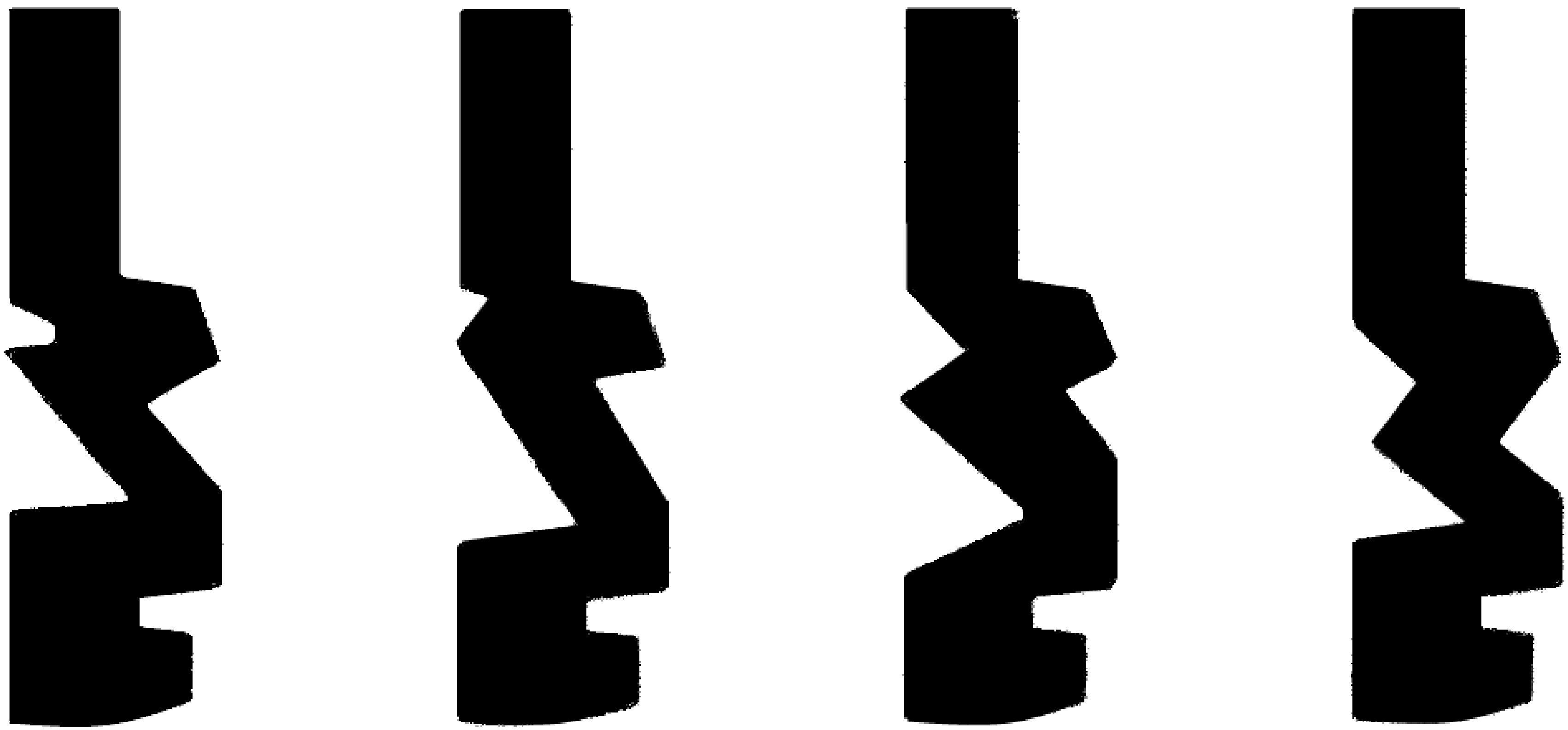
BEST Standard Cores



- Original Frank Best design from 1921
- Available in 6-pin and 7-pin versions
- 5-pin available by special order
- Contains Keyway Families:
  - A,D,E,F,G
  - J,K,L,M
  - Keyway families can be used to expand the key system size beyond its normal limitations
- J, K, L & M keyways can be operated by their respective CORMAX Keyways, MJ, MK, ML & MM

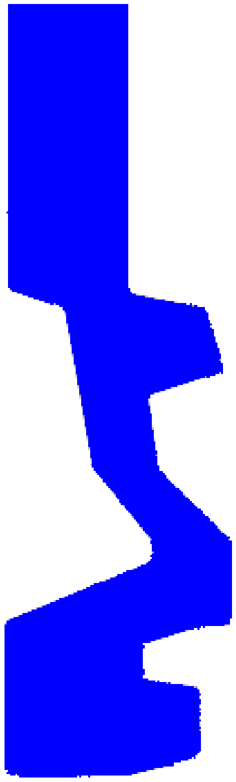
4 Keyways in a Keyway Family

(also known as Sectional or Multiplex Keyways)



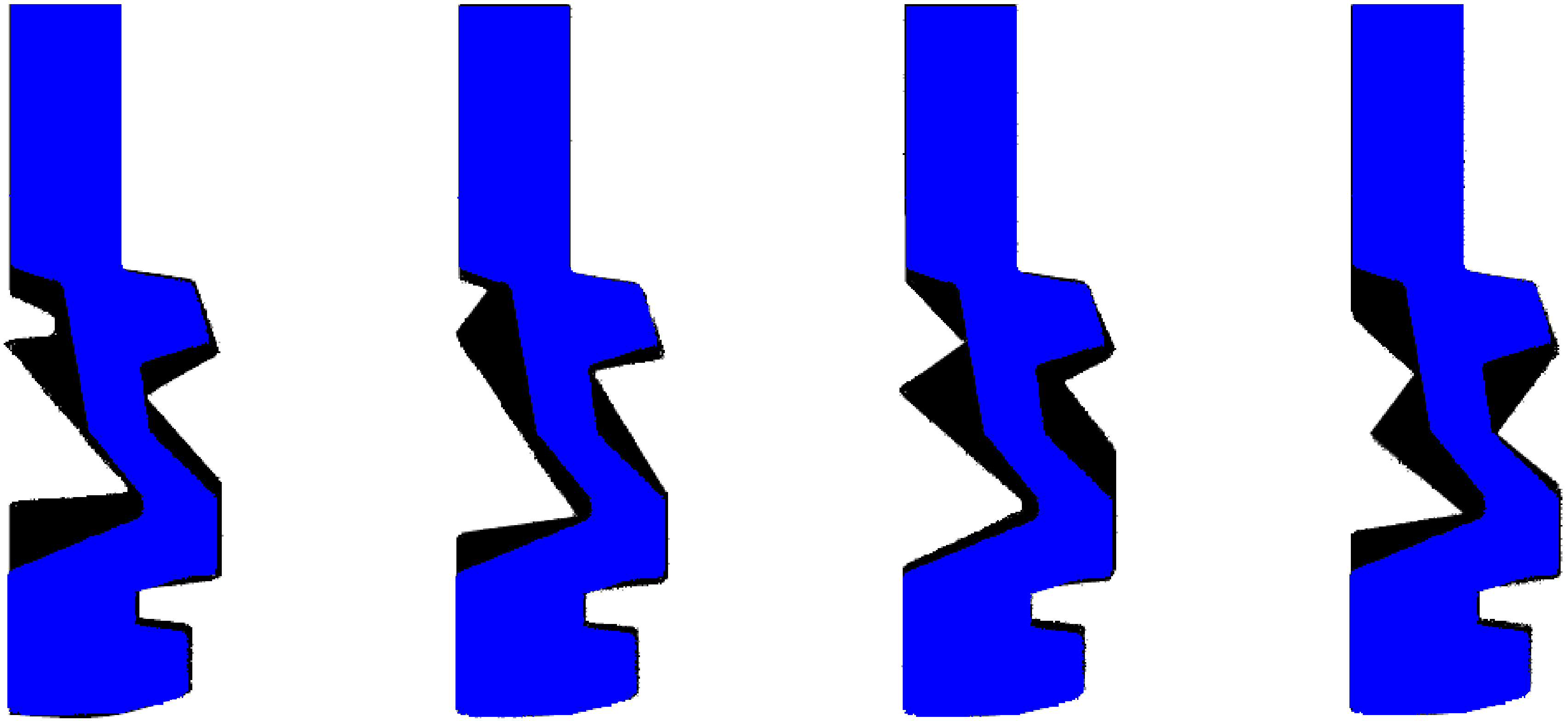
J K L M

A Multi-Milled Key for the Same Keyway Family



JKLM Key

Multi-Milled Key Enters All 4 Keyways in this Family



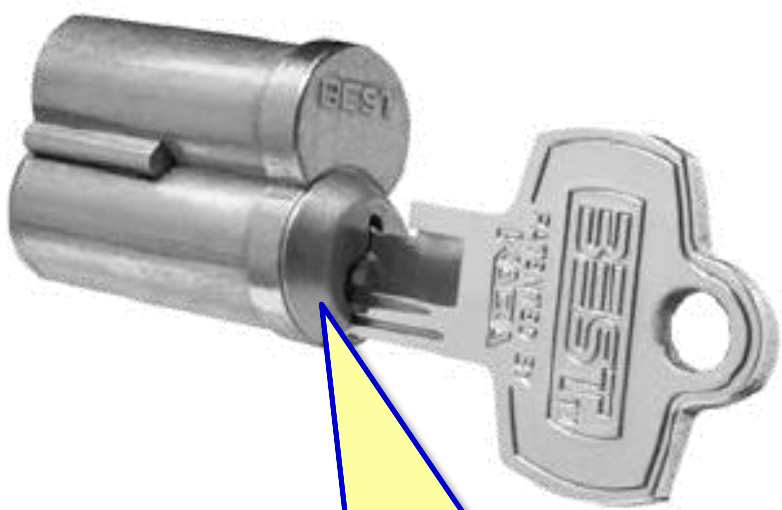
J K L M

BEST Premium Cores



- Similar to Standard Cores
- Keyway shapes were protected by Design Patent
- Highly figured keyways provide additional picking resistance
- Heavier, thicker key
- Shoulder of key enters notch above keyway to help prevent key breakage
- 7-pin only

BEST PEAKS Cores

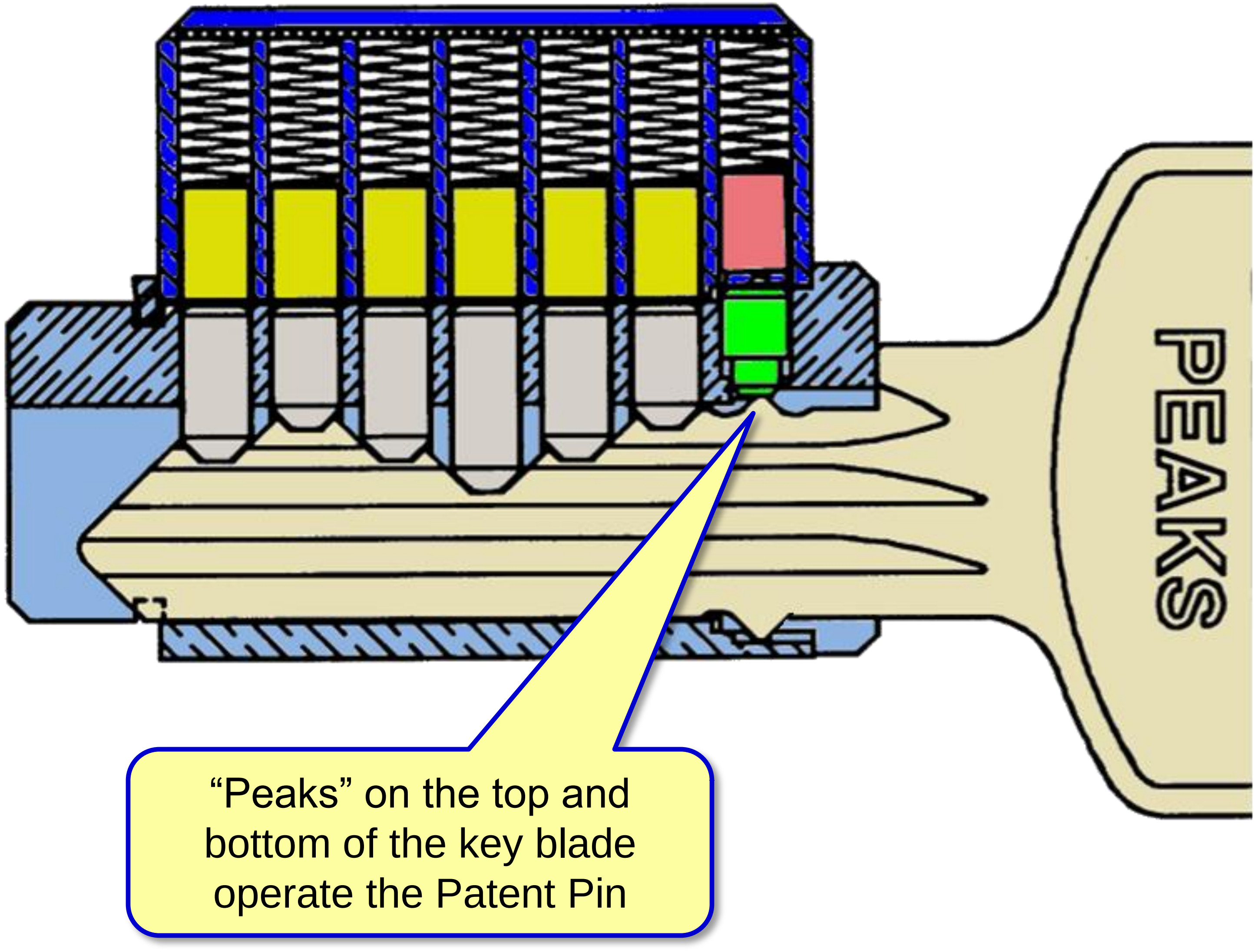


Peaks cores have a domed face on the plug that acts as a “stop” for the shoulder of the key.

- “Peaks” on top and bottom of key blade lift “Patent Pin” to its own unique shearline
- Produced under license from Kaba
- Patent expired June, 2010

BEST PEAKS

(Standard lock cylinder shown)



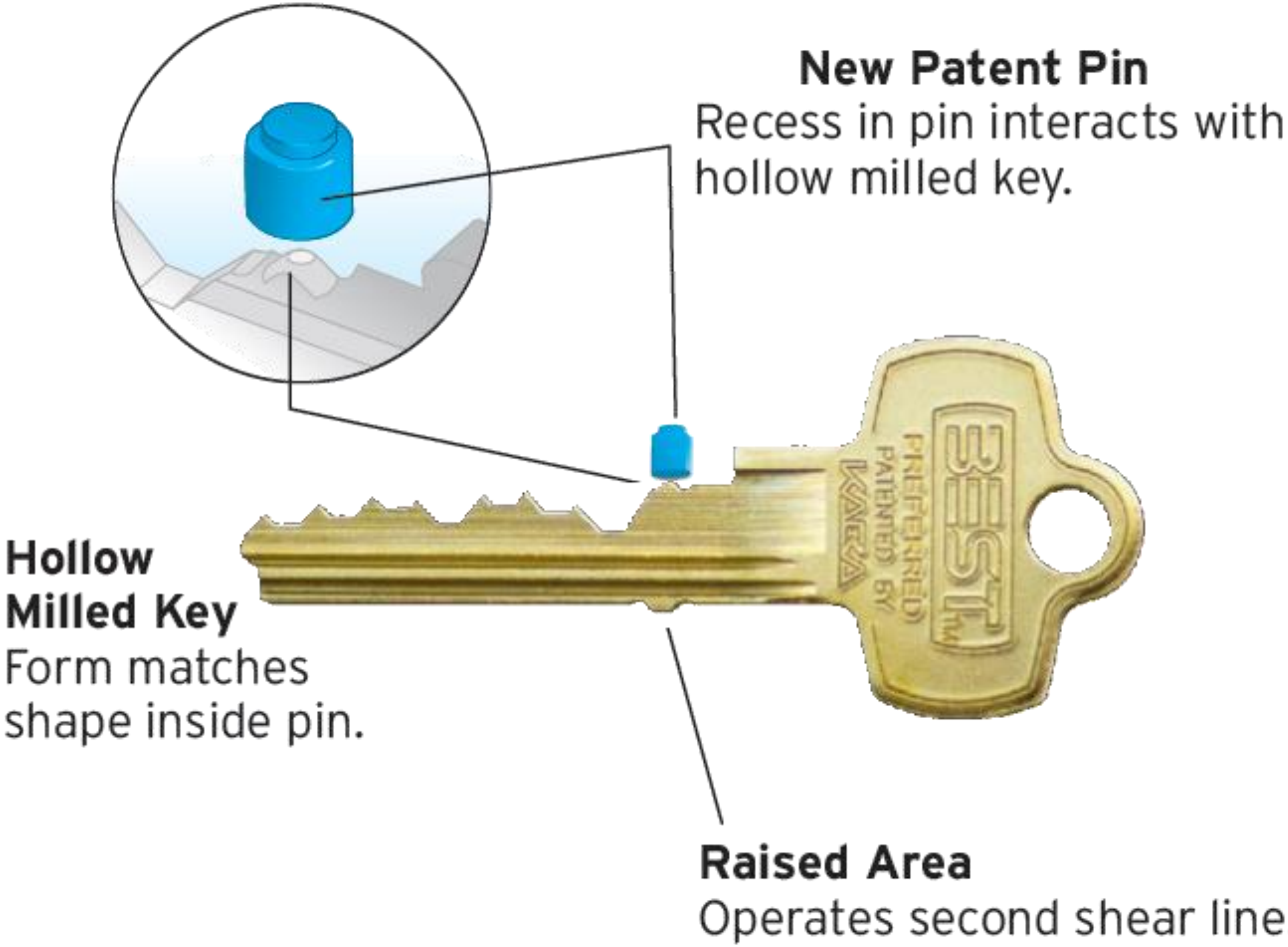
BEST PREFERRED Cores

- Similar to PEAKS but with a modified Patent Pin and Peak design
- Patent expires in the year 2024

“Preferred” cores have domed plugs like the “Peaks” cores but there is also the word PREFERRED on the core face.



BEST PREFERRED Cores



CORMAX™
PATENTED KEYING SYSTEM

(Previously MX8)

- Originally called MX8
- Stanley engineers redesigned the “Patent Pin” and a new patent was issued by the U.S. Patent Office
- Rebranded as CORMAX
- Patent expires in the year 2027

CORMAX (and MX8) cores have CORMAX (or MX8) branding above the BEST logo.



CORMAX Patent Pin is clearly visible at the back of the core

BEST CORMAX Cores

M Series



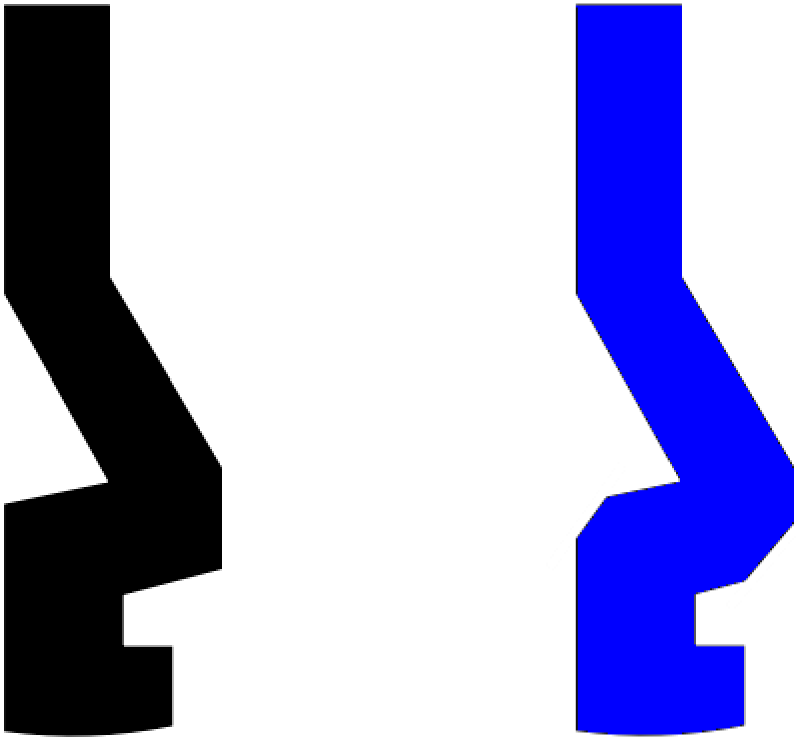
M series CORMAX keys are backwards compatible with their corresponding standard J, K, L, or M keyway cores.

X Series



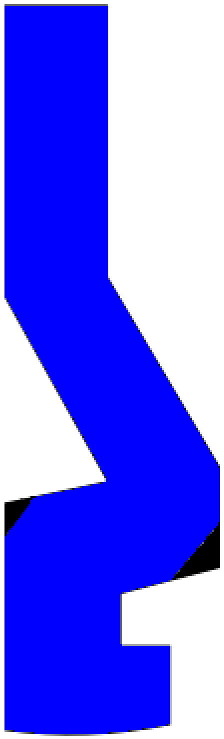
X series CORMAX keys are newer keyways and are not backwards compatible with any older BEST keyways.

Keyway Backwards Compatibility



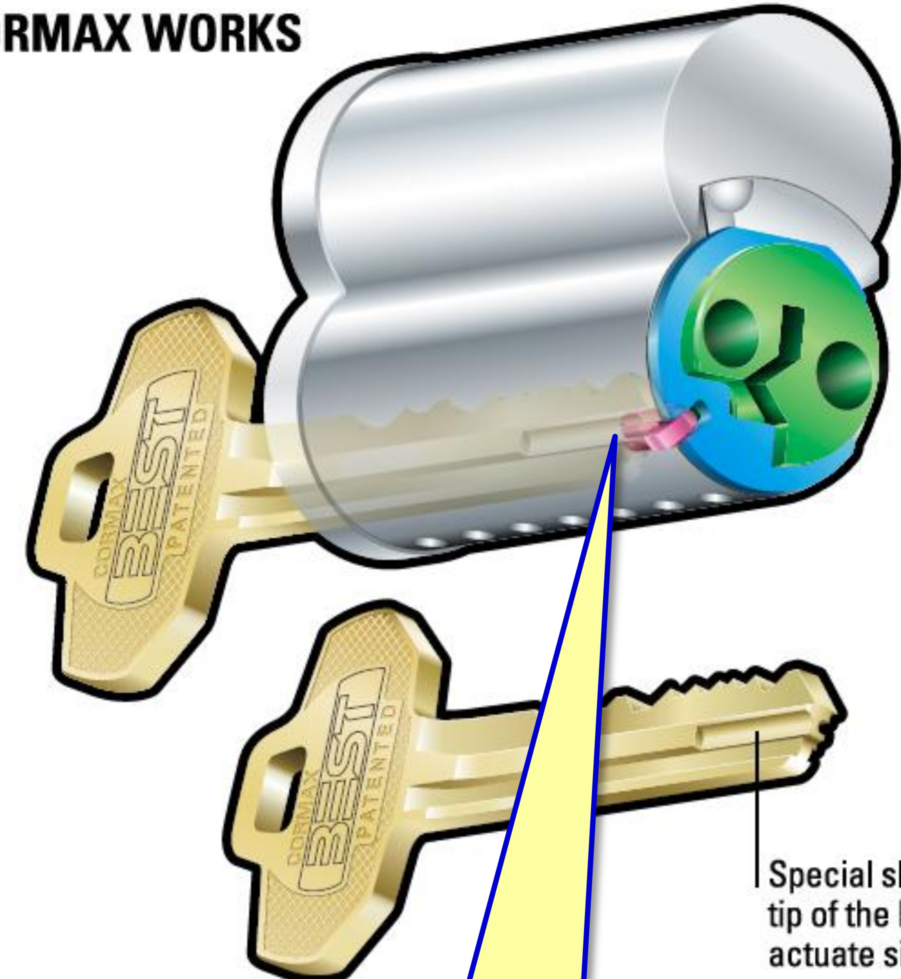
The key on the right will be able to enter its own keyway and the keyway of the core associated with the key on the left, but not vice versa.

Keyway Backwards Compatibility



If we cover the **BLACK** keyway profile with the **BLUE** keyway profile we can see that the blue keyway is slightly different in shape and smaller than the black keyway. This is what allows the blue to fit into the black keyway but not the opposite.

HOW CORMAX WORKS



Special slot at tip of the key to actuate side pin

4 different slot/pin configurations are available per keyway.

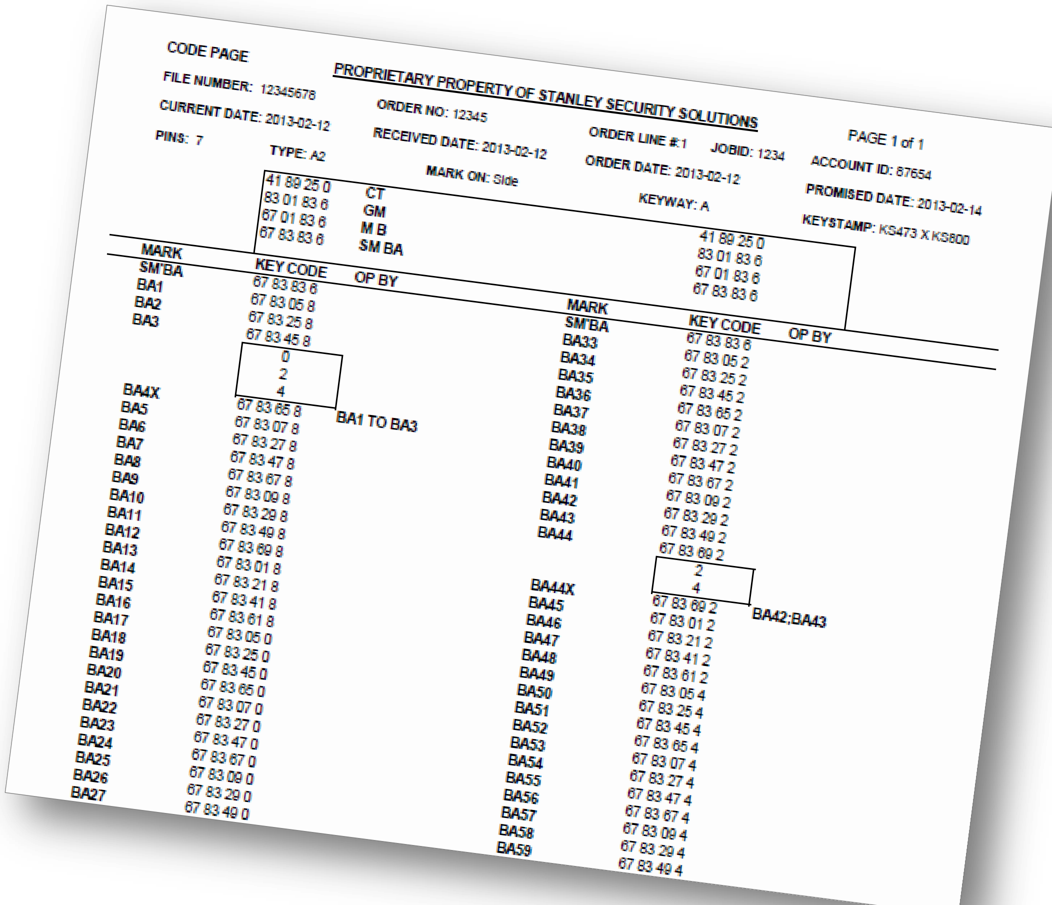


Patented side pin engages slot in core body and sleeve, preventing rotation unless the proper CORMAX key is present.



Patented side pin slides out to disengage from the body and sleeve when the proper CORMAX key is inserted.

BEST Key System Types



CODE PAGE

FILE NUMBER: 12345678

CURRENT DATE: 2013-02-12

PINS: 7 TYPE: A2

PROPRIETARY PROPERTY OF STANLEY SECURITY SOLUTIONS

ORDER NO: 12345

RECEIVED DATE: 2013-02-12

MARK ON: Side

ORDER LINE #:1 JOBID: 1234

ORDER DATE: 2013-02-12

KEYWAY: A

PAGE 1 of 1

ACCOUNT ID: 87654

PROMISED DATE: 2013-02-14

KEYSTAMP: KS473 X KS800

41 89 25 0	CT
83 01 83 6	GM
67 01 83 6	M B
67 83 83 6	SM BA

MARK	KEY CODE	OP BY
SM'BA	67 83 83 6	
BA1	67 83 05 8	
BA2	67 83 25 8	
BA3	67 83 45 8	
	0 / 2 / 4	BA1 TO BA3
BA4X	67 83 65 8	
BA5	67 83 07 8	
BA6	67 83 27 8	
BA7	67 83 47 8	
BA8	67 83 67 8	
BA9	67 83 09 8	
BA10	67 83 29 8	
BA11	67 83 49 8	
BA12	67 83 69 8	
BA13	67 83 01 8	
BA14	67 83 21 8	
BA15	67 83 41 8	
BA16	67 83 61 8	
BA17	67 83 05 0	
BA18	67 83 25 0	
BA19	67 83 45 0	
BA20	67 83 65 0	
BA21	67 83 07 0	
BA22	67 83 27 0	
BA23	67 83 47 0	
BA24	67 83 67 0	
BA25	67 83 09 0	
BA26	67 83 29 0	
BA27	67 83 49 0	

41 89 25 0	
83 01 83 6	
67 01 83 6	
67 83 83 6	

MARK	KEY CODE	OP BY
SM'BA	67 83 83 6	
BA33	67 83 05 2	
BA34	67 83 25 2	
BA35	67 83 45 2	
BA36	67 83 65 2	
BA37	67 83 07 2	
BA38	67 83 27 2	
BA39	67 83 47 2	
BA40	67 83 67 2	
BA41	67 83 09 2	
BA42	67 83 29 2	
BA43	67 83 49 2	
BA44	67 83 69 2	
	2 / 4	BA42;BA43
BA44X	67 83 69 2	
BA45	67 83 01 2	
BA46	67 83 21 2	
BA47	67 83 41 2	
BA48	67 83 61 2	
BA49	67 83 05 4	
BA50	67 83 25 4	
BA51	67 83 45 4	
BA52	67 83 65 4	
BA53	67 83 07 4	
BA54	67 83 27 4	
BA55	67 83 47 4	
BA56	67 83 67 4	
BA57	67 83 09 4	
BA58	67 83 29 4	
BA59	67 83 49 4	

BEST A2 & A4 System Specifications

A2 7-pin systems have 16,384 total key codes (4,096 for 6-pin)

- STACK HEIGHT (TOTAL STACK) = 23
- CONTROL CUT + 10 = CONTROL NUMBER (Example: 4 + 10 = 14)
- DOUBLE-STEP
- UTILIZES AN "ODD OVER ODD / EVEN OVER EVEN" PATTERN
- DEPTHS 0 – 9 (.0125" INCREMENT, DOUBLED TO .025)
- CUT 1 IS AT THE TIP OF THE KEY
- CUT 6 OR 7 IS NEAR THE BOW (HEAD) OF THE KEY

A4 7-pin systems have 78,125 total key codes (15,625 for 6-pin)

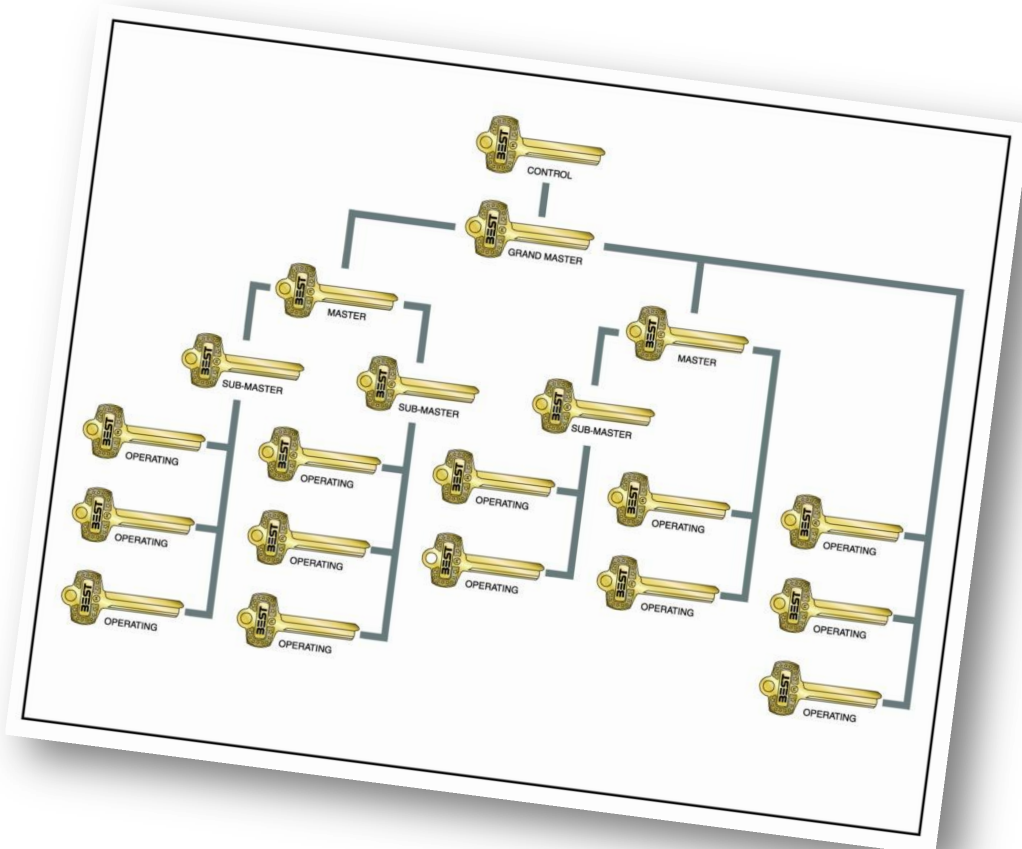
- STACK HEIGHT (TOTAL STACK) = 14
- CONTROL CUT + 6 = CONTROL NUMBER (Example: 4 + 6 = 10)
- SINGLE STEP: **NO** "ODD OVER ODD / EVEN OVER EVEN" PATTERN
- DEPTHS 0 – 5 (.021" INCREMENT)
- CUT 1 IS AT THE TIP OF THE KEY
- CUT 6 OR 7 IS NEAR THE BOW (HEAD) OF THE KEY

BEST A3 System Specifications

A3 7-pin systems have 279,936 total key codes (46,656 for 6-pin)

- STACK HEIGHT (TOTAL STACK) = 16
- CONTROL CUT + 7 = CONTROL NUMBER (Example: 4 + 7 = 11)
- SINGLE STEP: NO "ODD OVER ODD / EVEN OVER EVEN" PATTERN
- DEPTHS 0 – 6 (.018" INCREMENT)
- CUT 1 IS AT THE TIP OF THE KEY
- CUT 6 OR 7 IS NEAR THE BOW (HEAD) OF THE KEY

BEST Key System Hierarchies



CODE PAGE | PROPRIETARY PROPERTY OF STANLEY SECURITY SOLUTIONS | PAGE 1 of 1

FILE NUMBER: 12345678 | ORDER NO: 12345 | ORDER LINE #:1 | JOBID: 1234 | ACCOUNT ID: 87654

CURRENT DATE: 2013-02-12 | RECEIVED DATE: 2013-02-12 | ORDER DATE: 2013-02-12 | PROMISED DATE: 2013-02-14

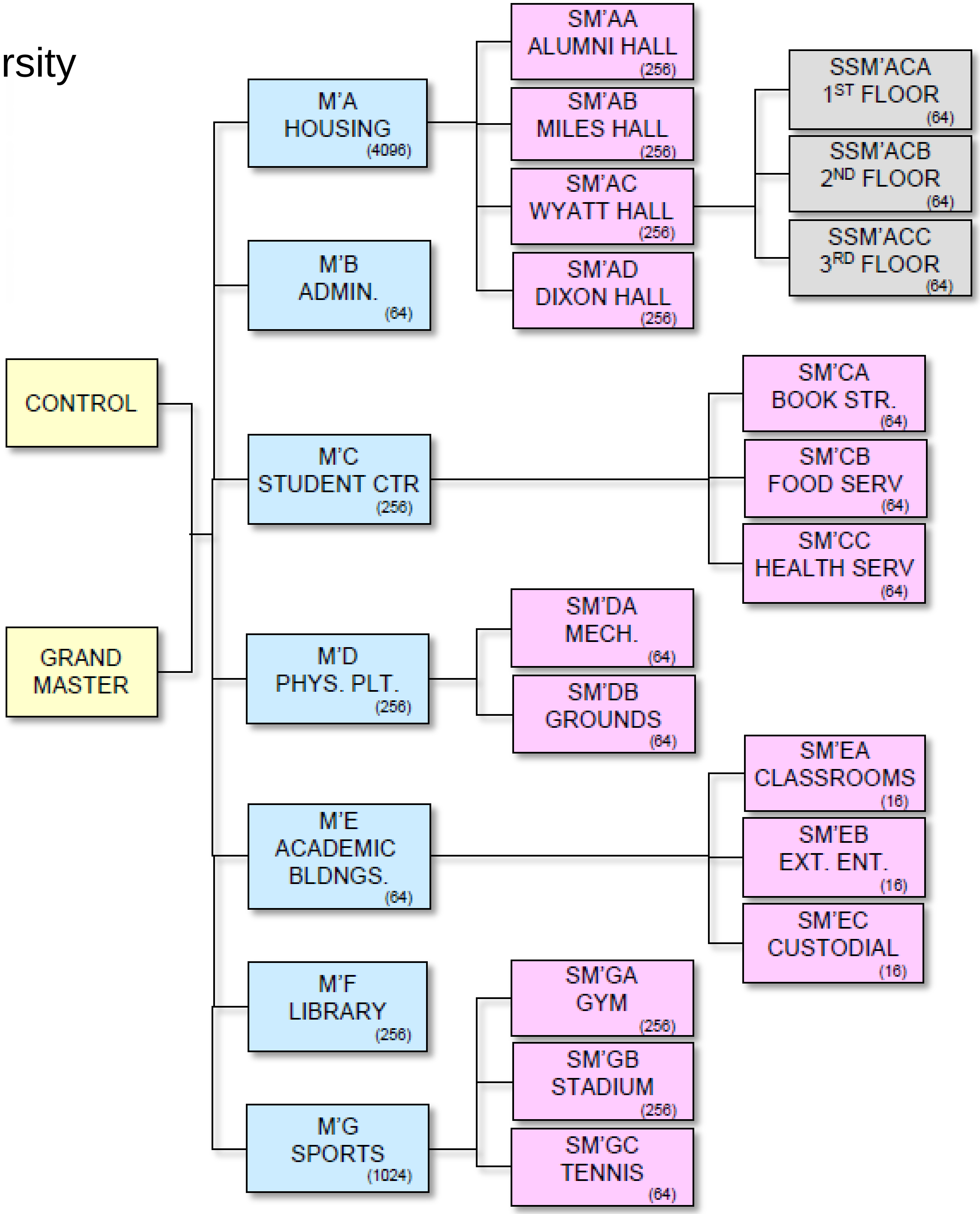
PINS: 7 | TYPE: A2 | MARK ON: Side | KEYWAY: A | KEYSTAMP: KS473 X KS800

41 89 25 0	CT	41 89 25 0
83 01 83 6	GM	83 01 83 6
67 01 83 6	M B	67 01 83 6
67 83 83 6	SM BA	67 83 83 6

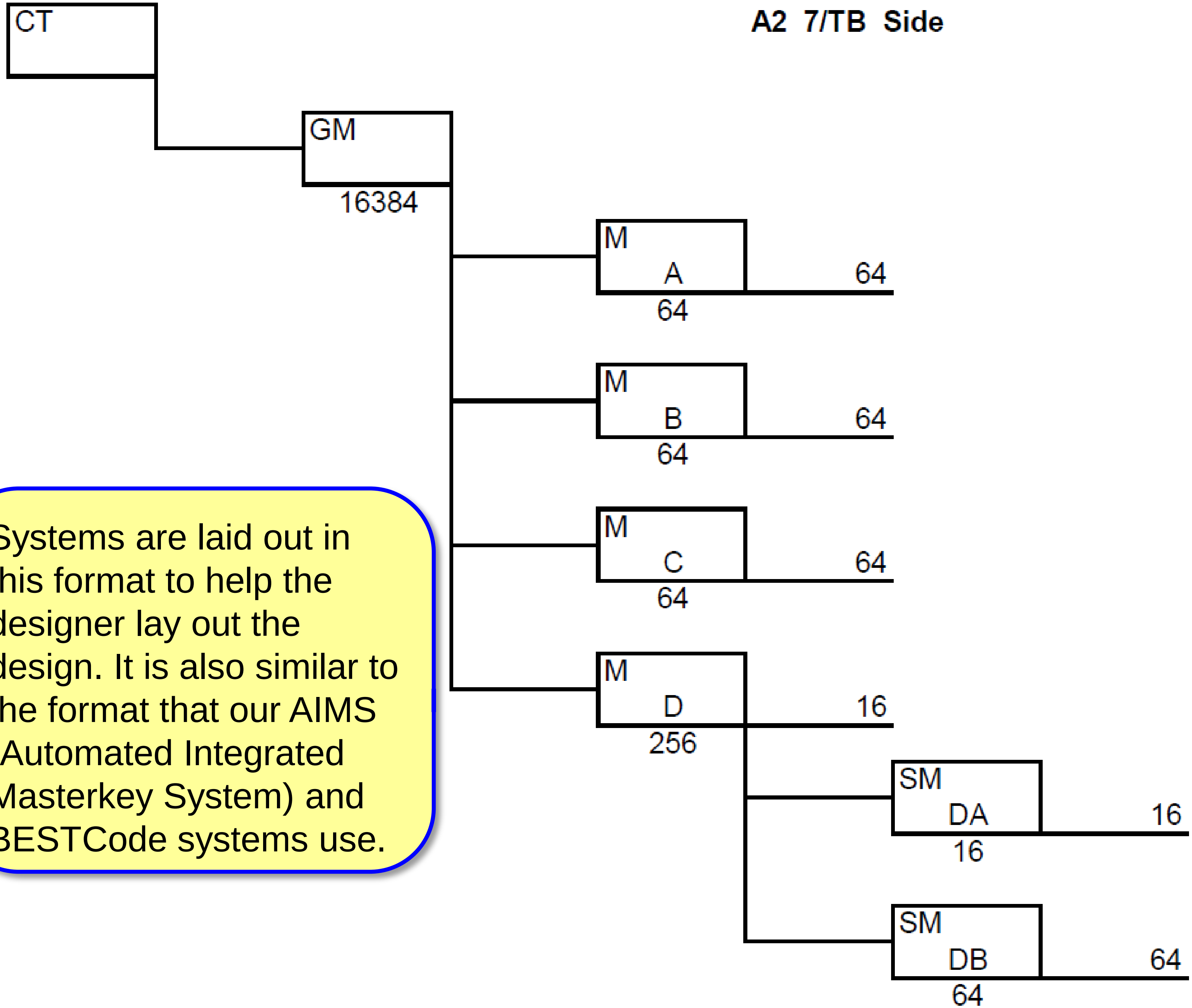
MARK	KEY CODE	OP BY	MARK	KEY CODE	OP BY
SM'BA	67 83 83 6		SM'BA	67 83 83 6	
BA1	67 83 05 8		BA33	67 83 05 2	
BA2	67 83 25 8		BA34	67 83 25 2	
BA3	67 83 45 8		BA35	67 83 45 2	
BA4	67 83 65 8		BA36	67 83 65 2	
	0		BA37	67 83 07 2	
	2		BA38	67 83 27 2	
	4		BA39	67 83 47 2	
BA4X	67 83 65 8	BA1 TO BA3	BA40	67 83 67 2	
BA5	67 83 07 8		BA41	67 83 09 2	
BA6	67 83 27 8		BA42	67 83 29 2	
BA7	67 83 47 8		BA43	67 83 49 2	
BA8					
BA9					
BA10					
BA11					
BA12					
BA13					
BA14					
BA15					
BA16					
BA17					
BA18					
BA19					
BA20					
BA21					
BA22	67 83 27 0		BA55	67 83 47 4	
BA23	67 83 47 0		BA56	67 83 67 4	
BA24	67 83 67 0		BA57	67 83 09 4	
BA25	67 83 09 0		BA58	67 83 29 4	
BA26	67 83 29 0		BA59	67 83 49 4	
BA27	67 83 49 0		BA60	67 83 69 4	
BA28	67 83 69 0		BA61	67 83 01 4	
BA29	67 83 01 0		BA62	67 83 21 4	
BA30	67 83 21 0		BA63	67 83 41 4	
BA31	67 83 41 0			05 8	
BA32	67 83 61 0			27 0	
				49 2	
			BA64X	67 83 61 4	ALL SM'BA

This sheet is a sample BEST "Code Page". Code pages contain masterkey system information. To understand the information on the code page you must first understand the key system structure or hierarchy.

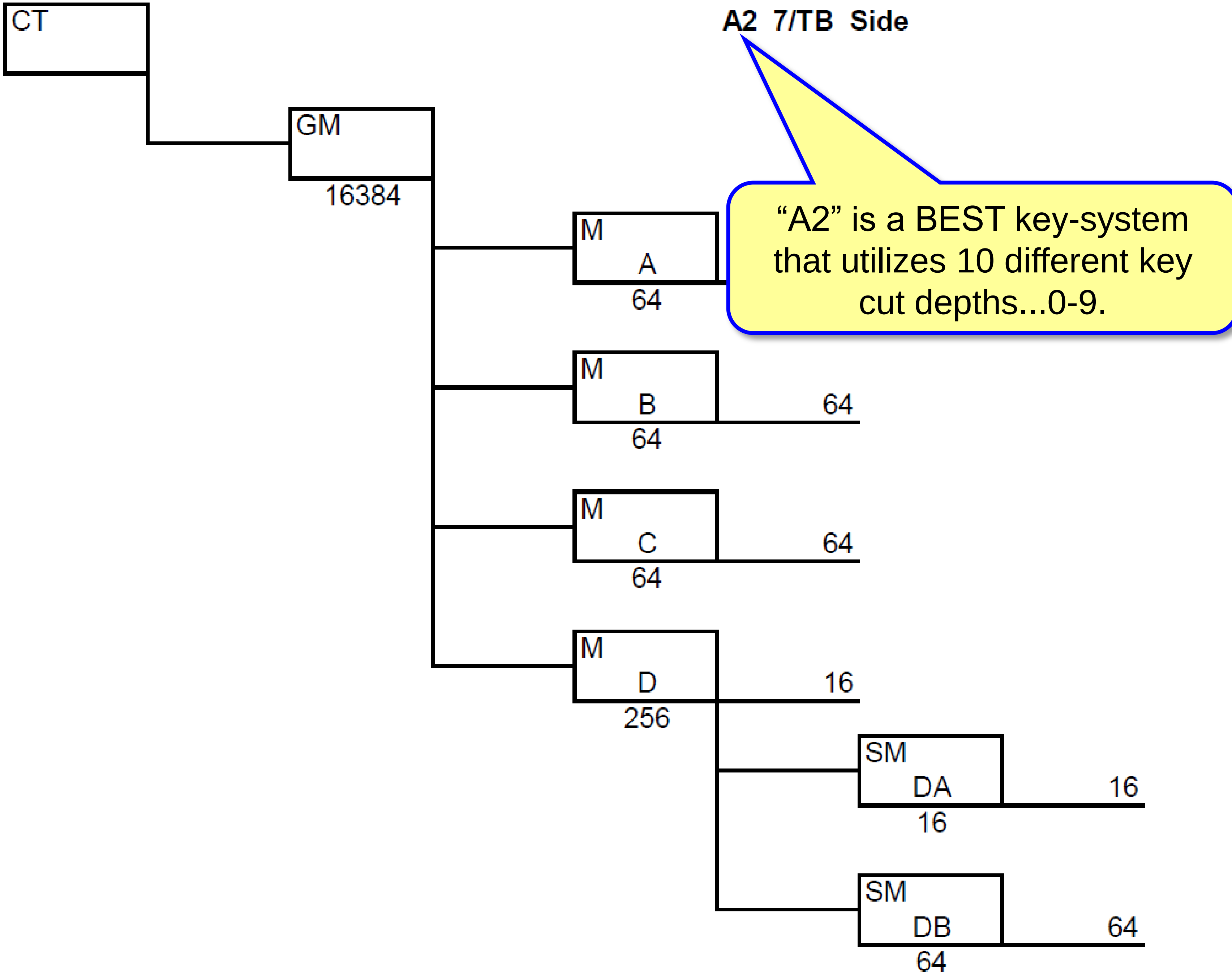
College / University Example

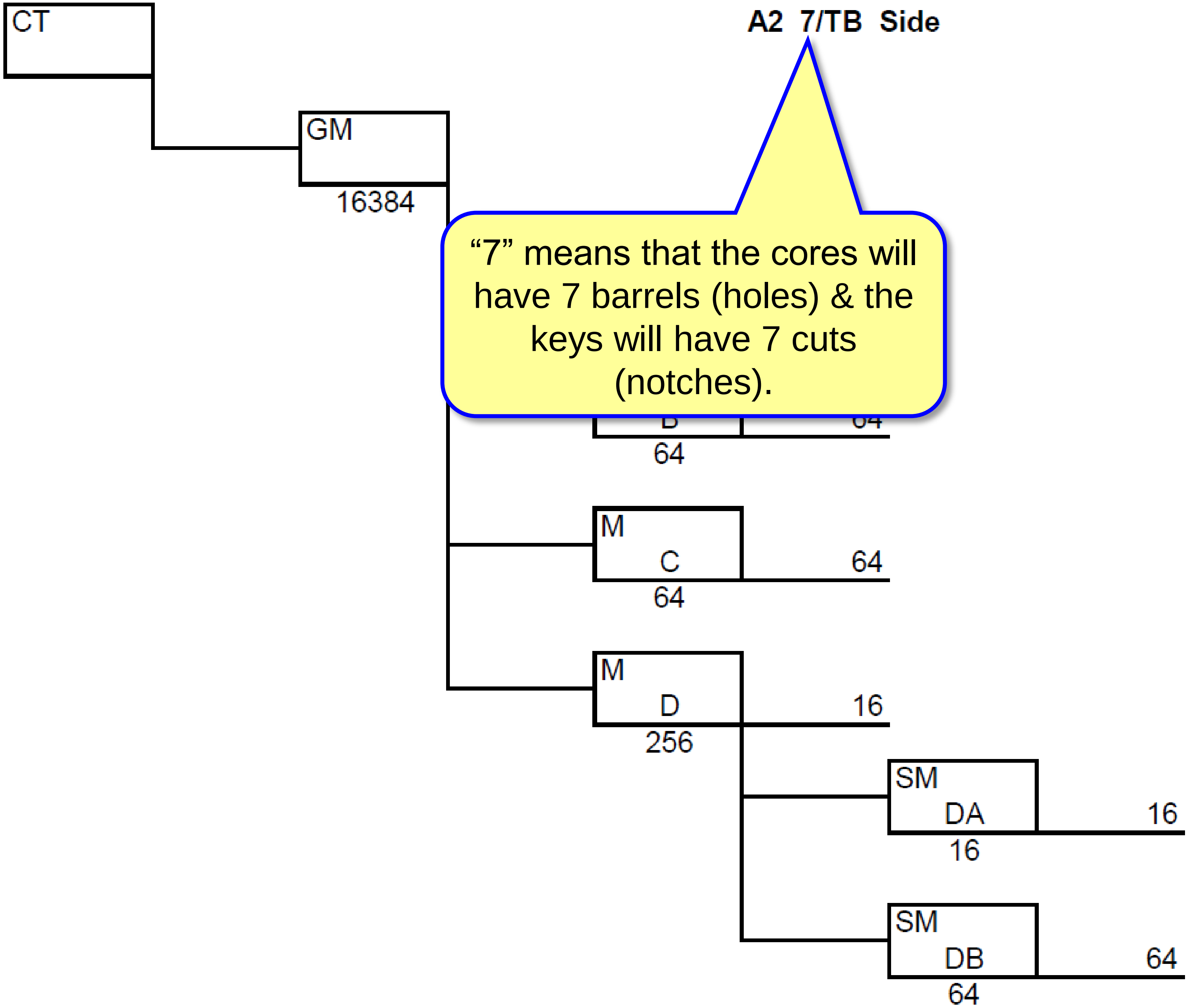


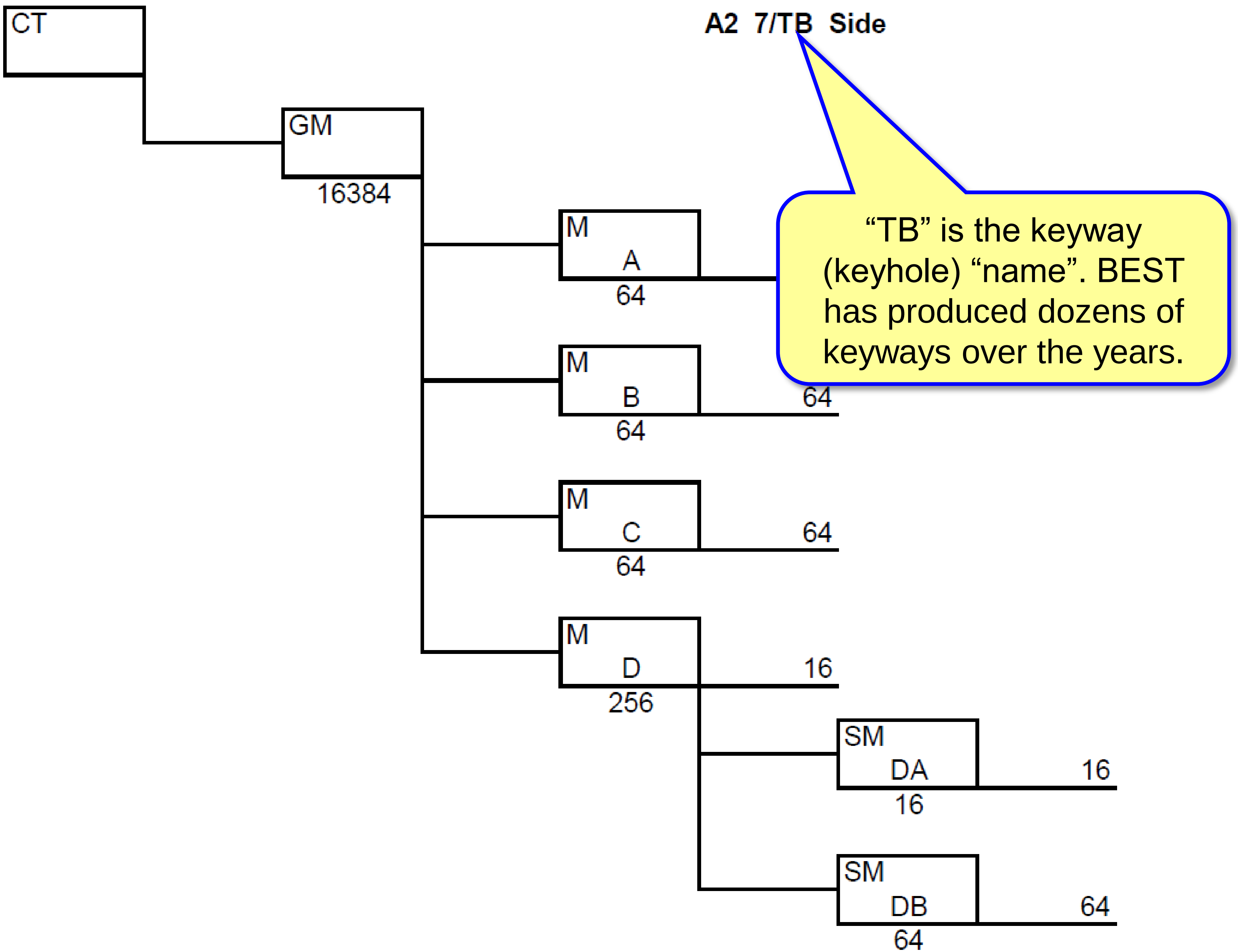
A2 7/TB Side

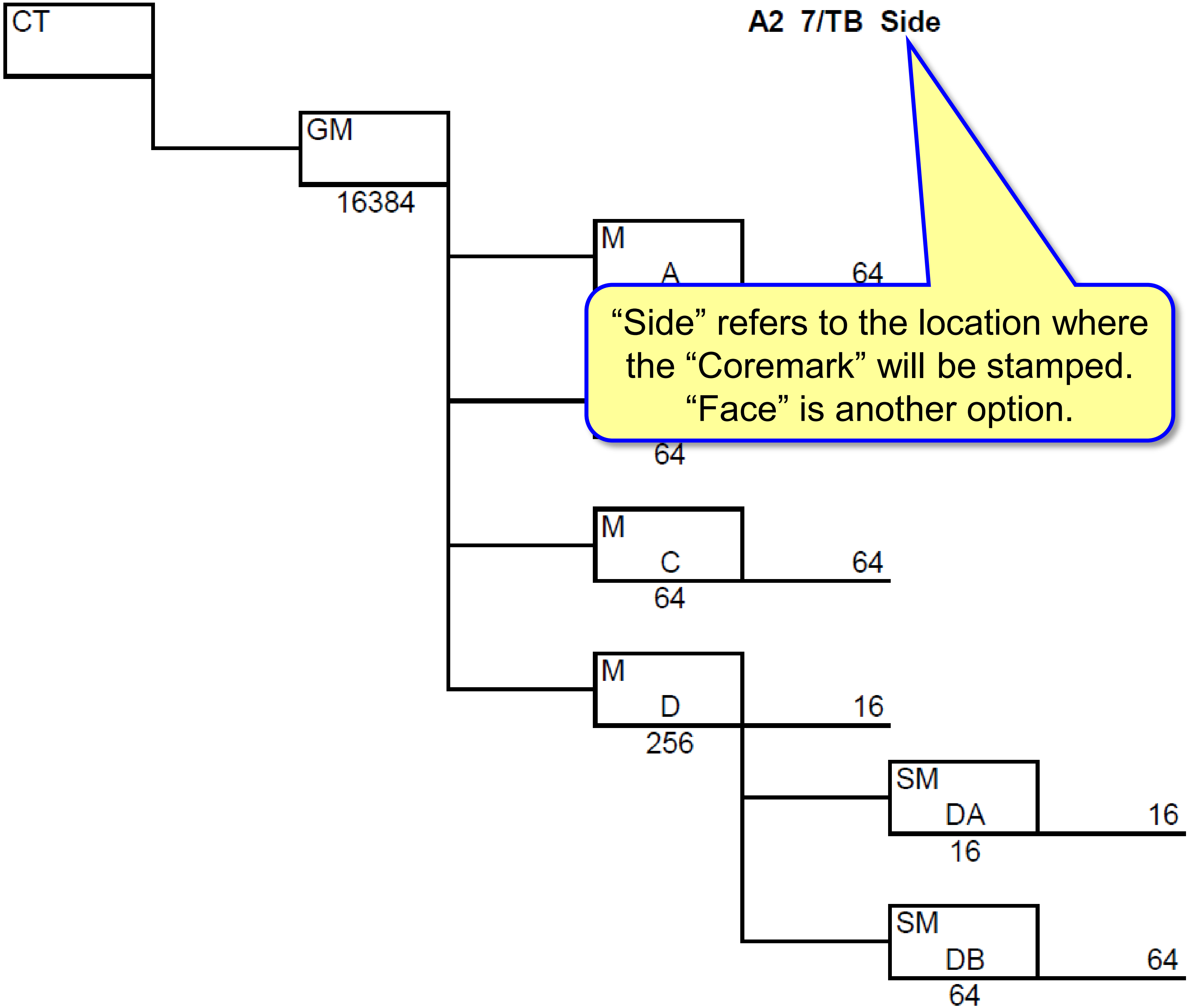


Systems are laid out in this format to help the designer lay out the design. It is also similar to the format that our AIMS (Automated Integrated Masterkey System) and BESTCode systems use.


A2 7/TB Side
“A2” is a BEST key-system that utilizes 10 different key cut depths...0-9.
CT
GM
16384
M
A
64
M
B
64
64
M
C
64
64
M
D
256
16
SM
DA
16
16
SM
DB
64
64

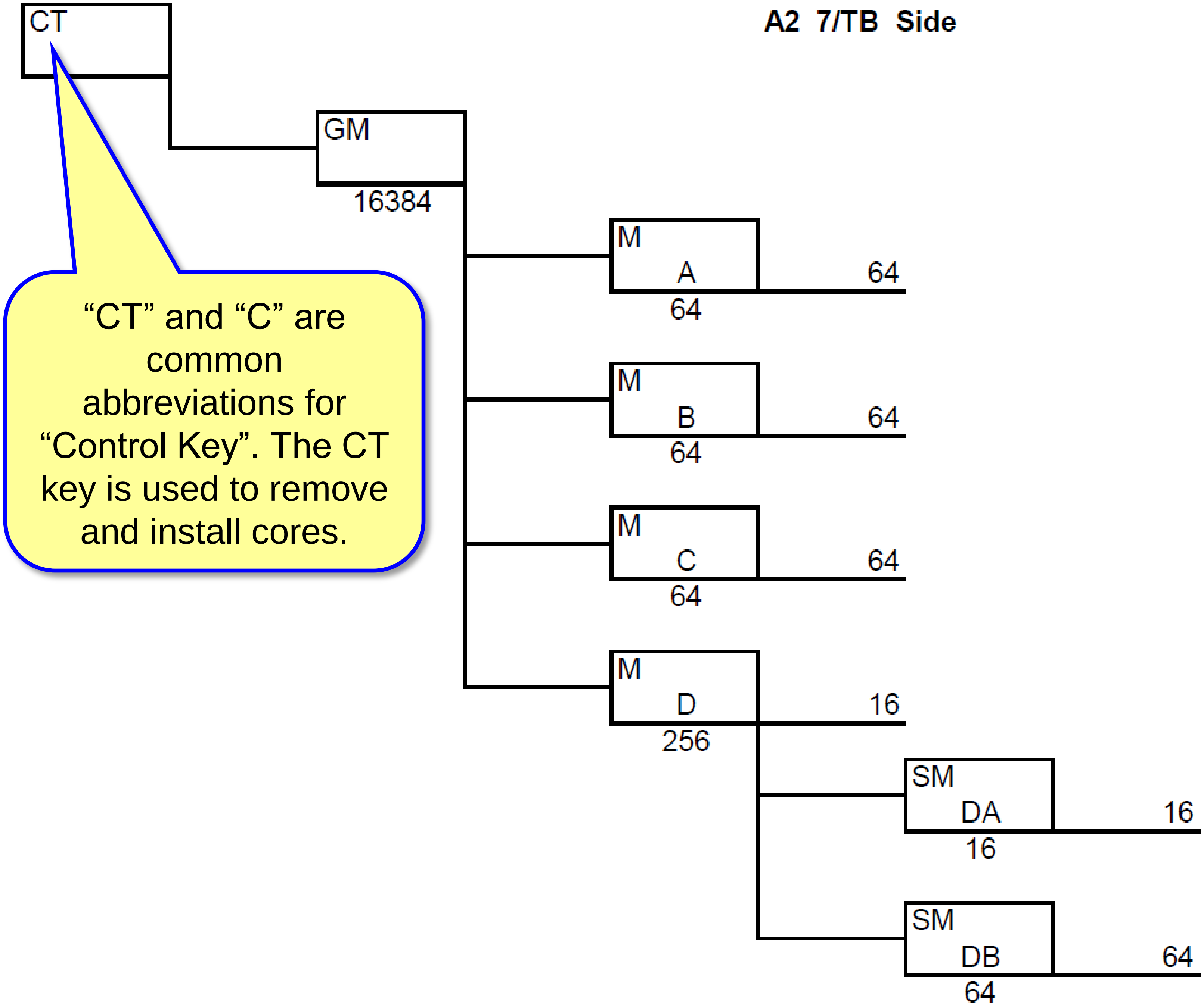

A2 7/TB Side
CT
GM
16384
“7” means that the cores will have 7 barrels (holes) & the keys will have 7 cuts (notches).
64
M
C
64
64
M
D
16
256
SM
DA
16
16
SM
DB
64
64


A2 7/TB Side
CT
GM
16384
M
A
64
M
B
64
64
M
C
64
64
M
D
256
16
SM
DA
16
16
SM
DB
64
64
“TB” is the keyway (keyhole) “name”. BEST has produced dozens of keyways over the years.

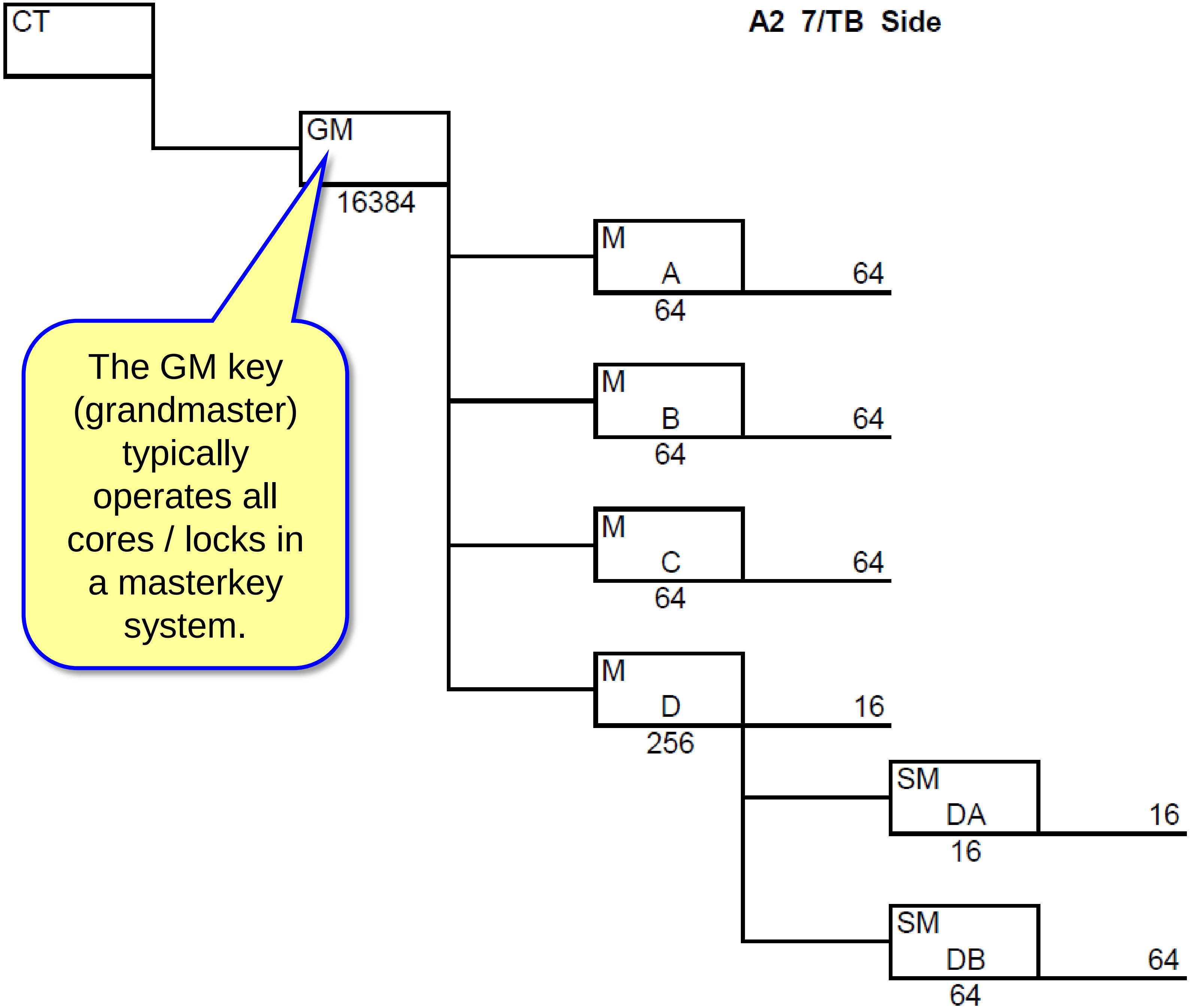


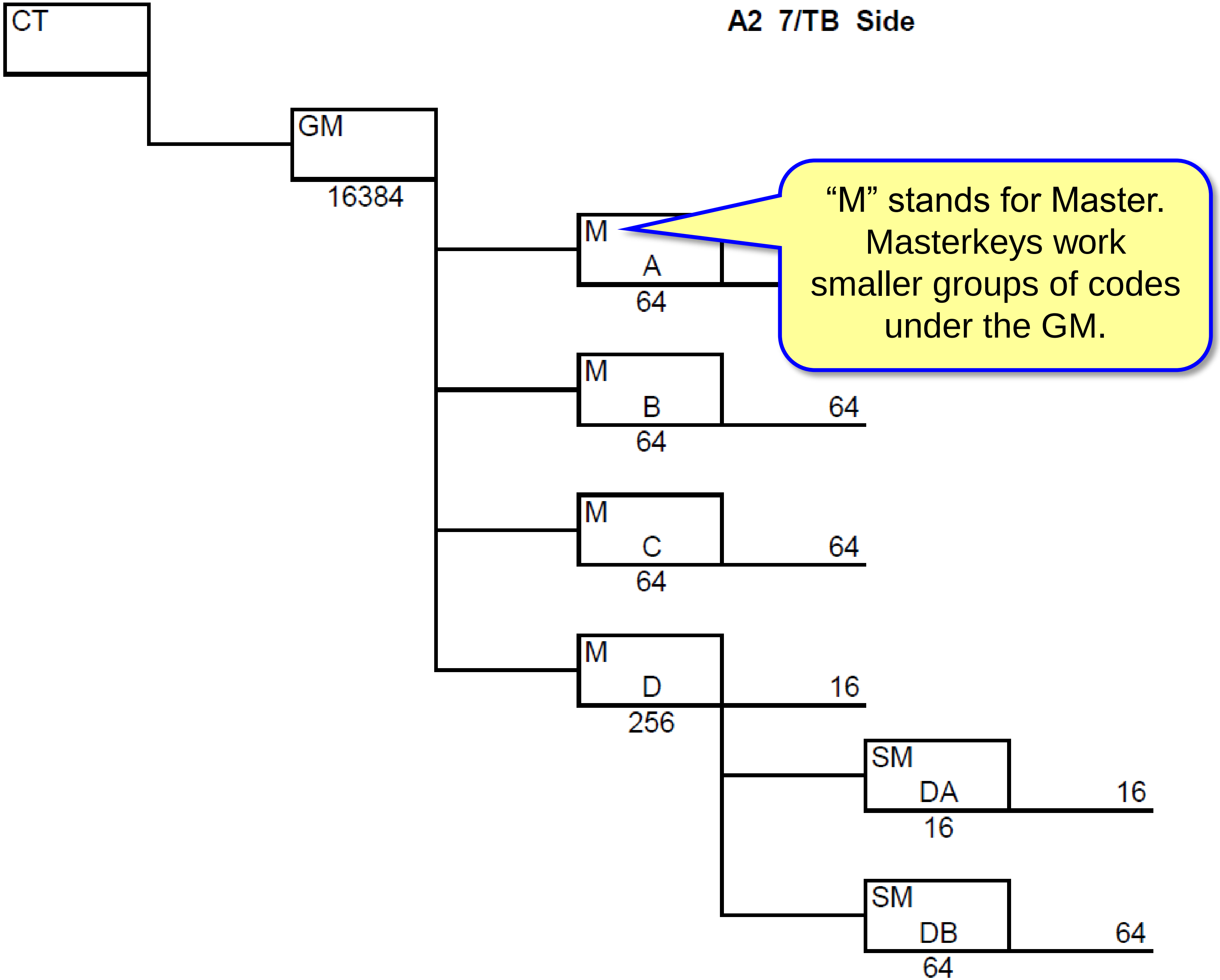
A2 7/TB Side
CT
GM
16384
M
A
64
"Side" refers to the location where the "Coremark" will be stamped. "Face" is another option.
64
M
C
64
64
M
D
16
256
SM
DA
16
16
SM
DB
64
64

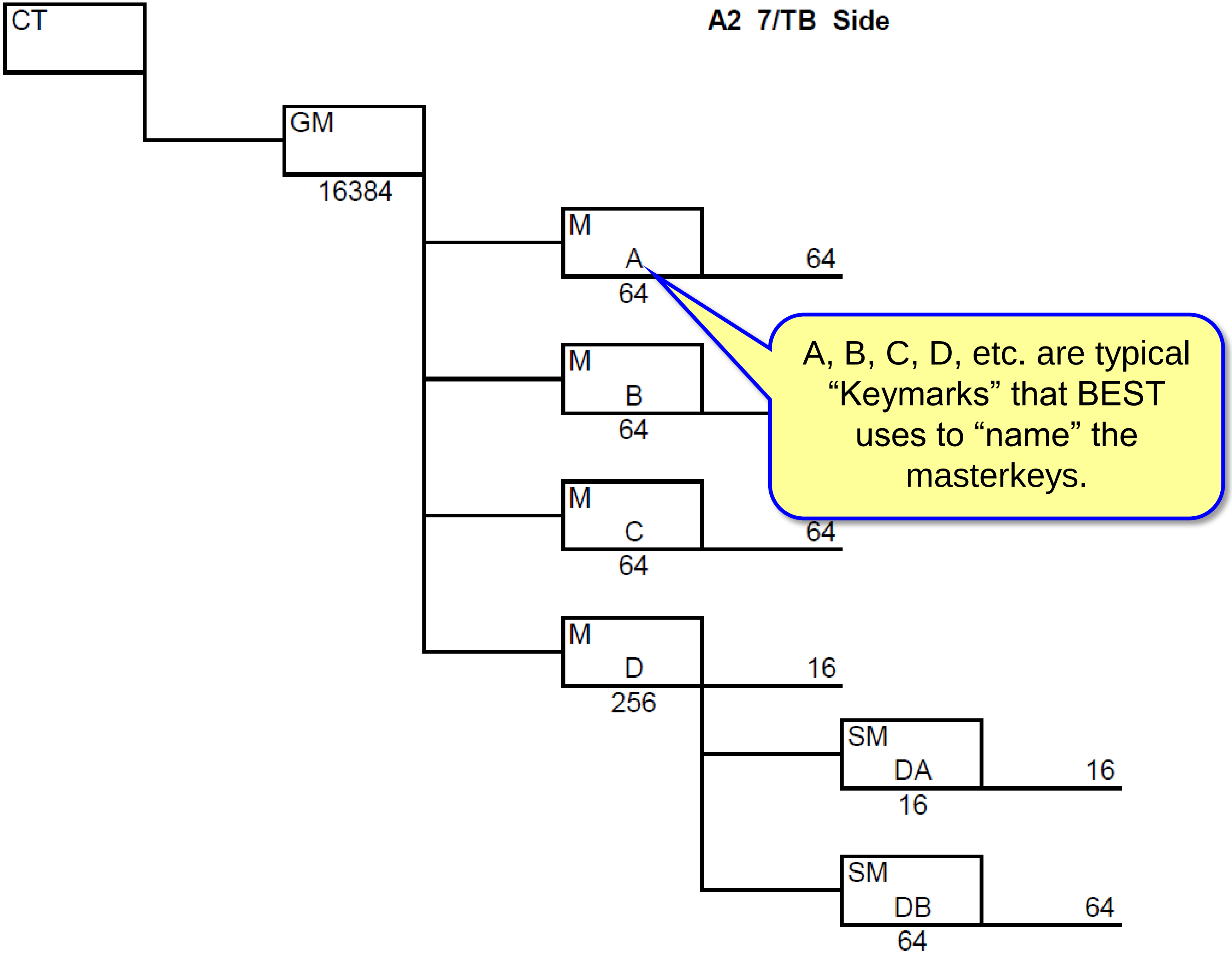
A2 7/TB Side

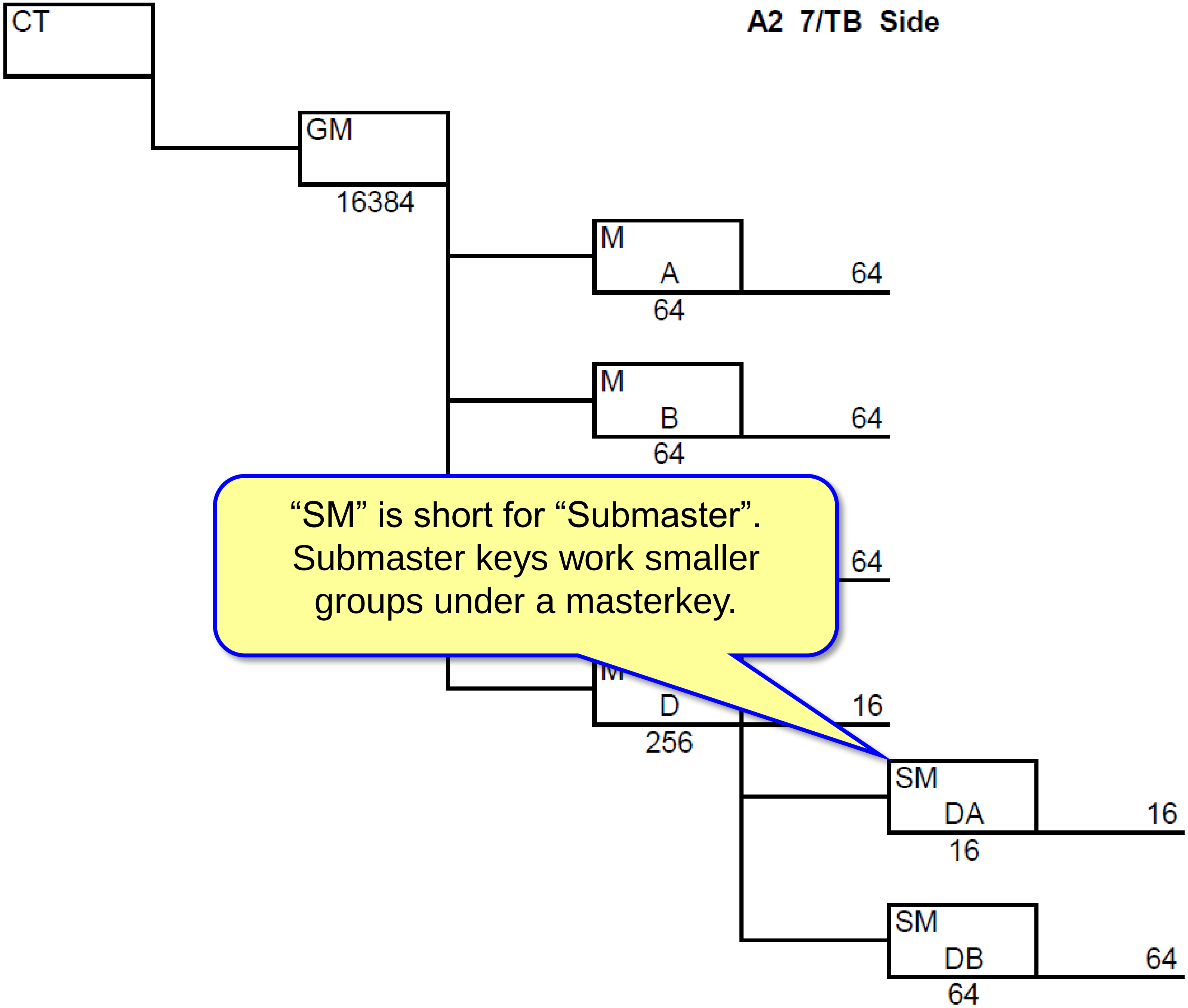

CT
GM
16384
M
A
64
64
M
B
64
64
M
C
64
64
M
D
256
16
SM
DA
16
16
SM
DB
64
64
“CT” and “C” are common abbreviations for “Control Key”. The CT key is used to remove and install cores.

A2 7/TB Side

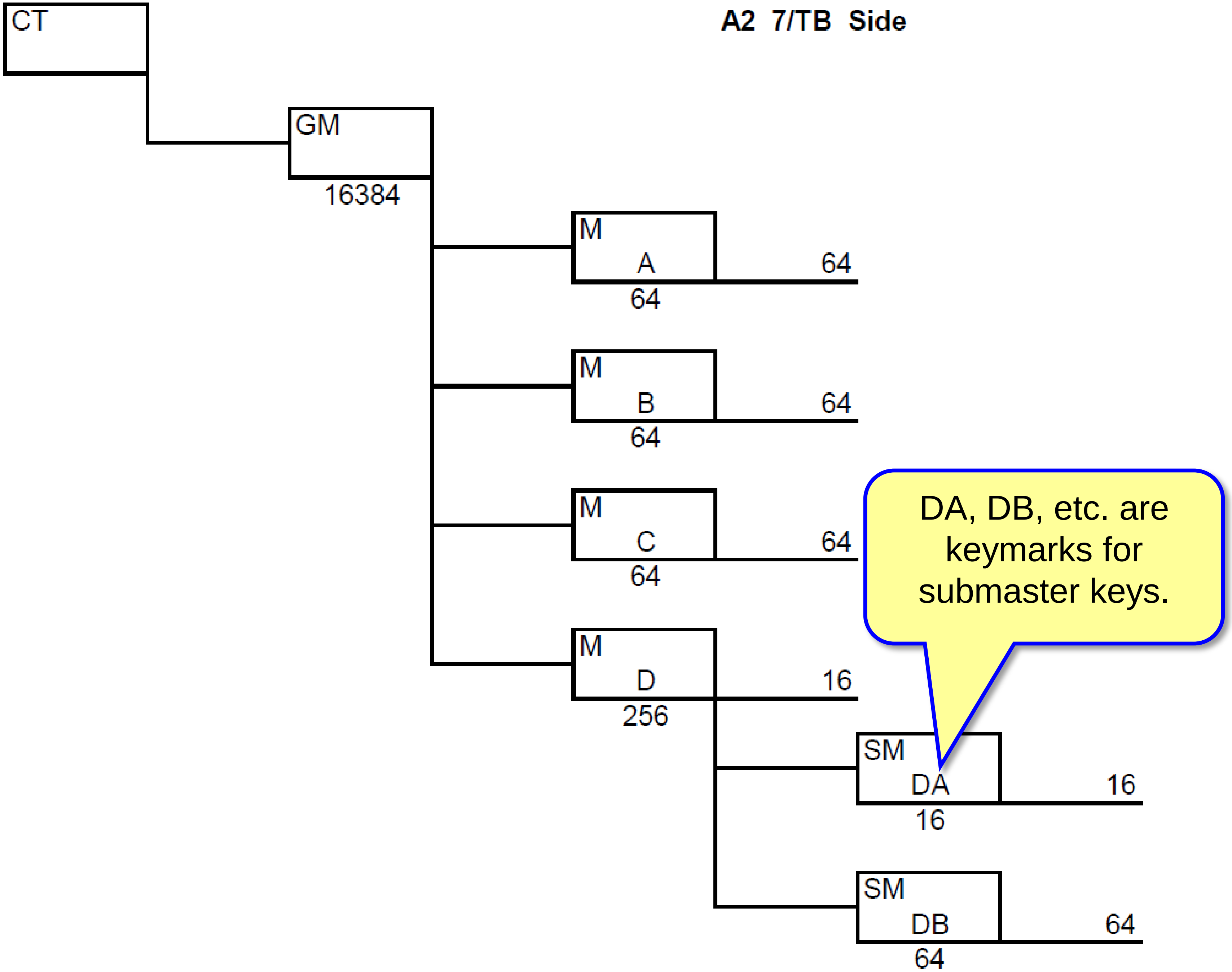

CT
GM
16384
The GM key (grandmaster) typically operates all cores / locks in a masterkey system.
M
A
64
64
M
B
64
64
M
C
64
64
M
D
16
256
SM
DA
16
16
SM
DB
64
64

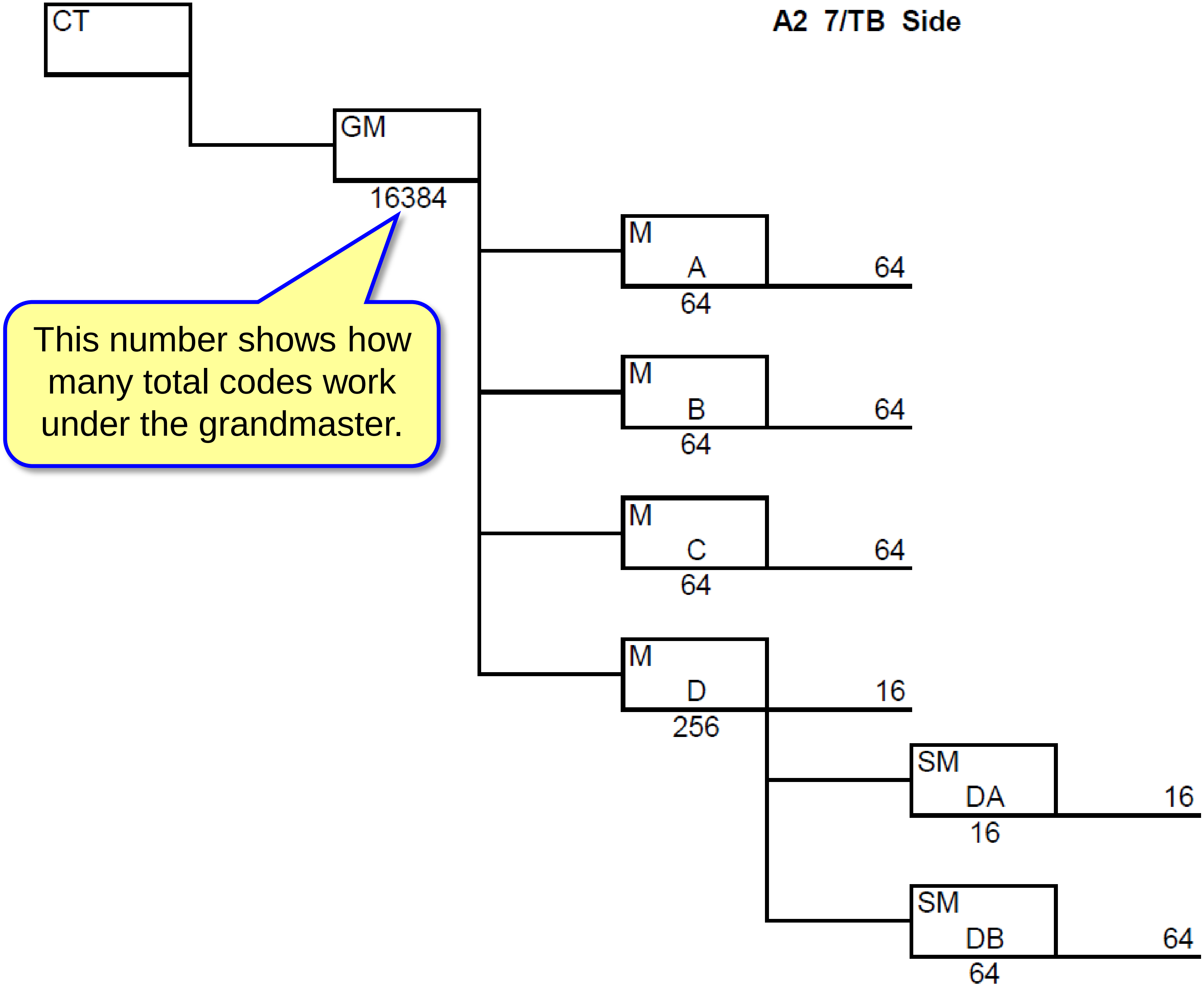

A2 7/TB Side
CT
GM
16384
“M” stands for Master. Masterkeys work smaller groups of codes under the GM.
M
A
64
M
B
64
64
M
C
64
64
M
D
256
16
SM
DA
16
16
SM
DB
64
64

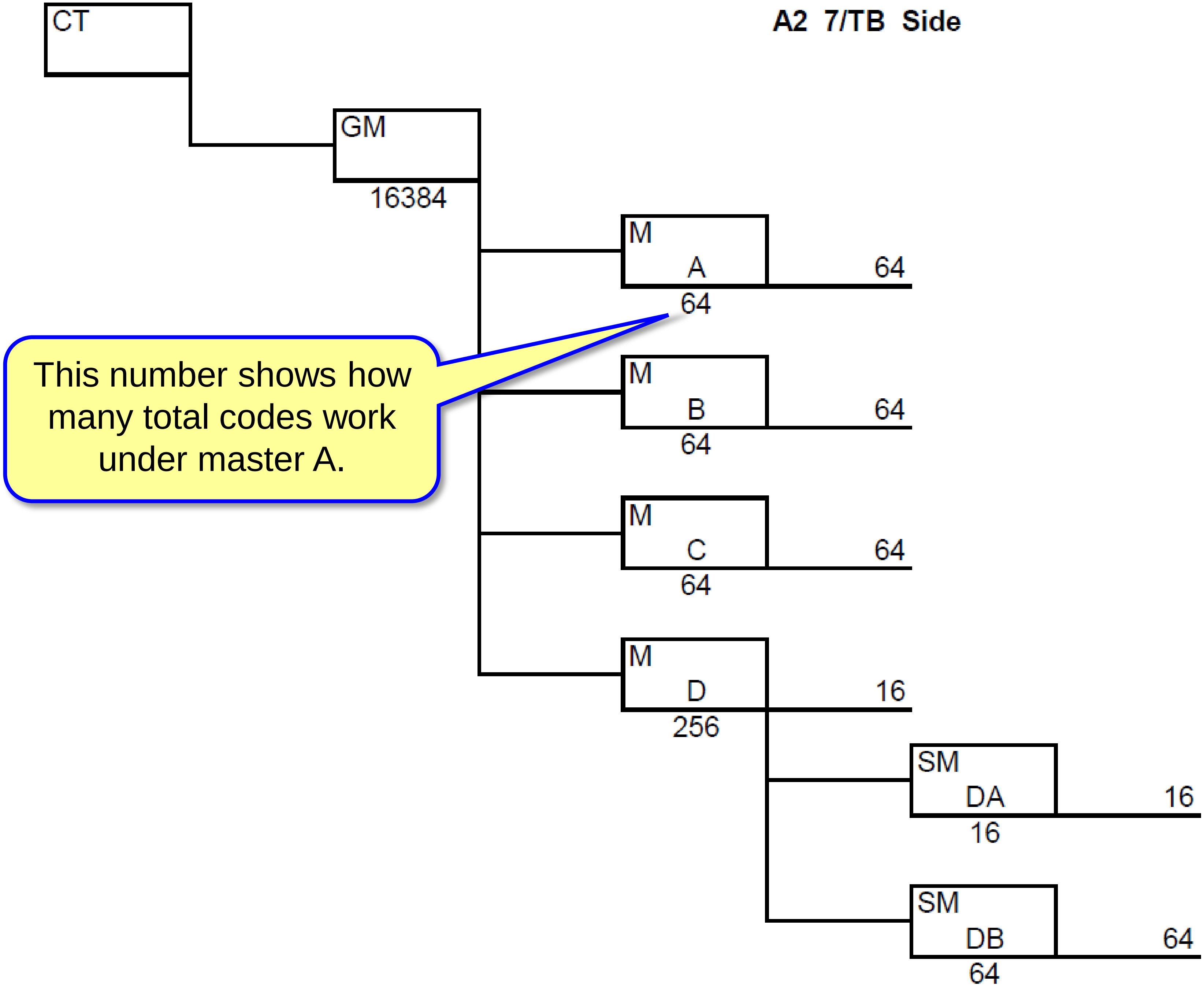

CT
A2 7/TB Side
GM
16384
M
A
64
64
M
B
64
M
C
64
64
M
D
256
16
SM
DA
16
16
SM
DB
64
64
A, B, C, D, etc. are typical "Keymarks" that BEST uses to "name" the masterkeys.


A2 7/TB Side
CT
GM
16384
M
A
64
64
M
B
64
64
64
“SM” is short for “Submaster”.
Submaster keys work smaller
groups under a masterkey.
D
16
256
SM
DA
16
16
SM
DB
64
64

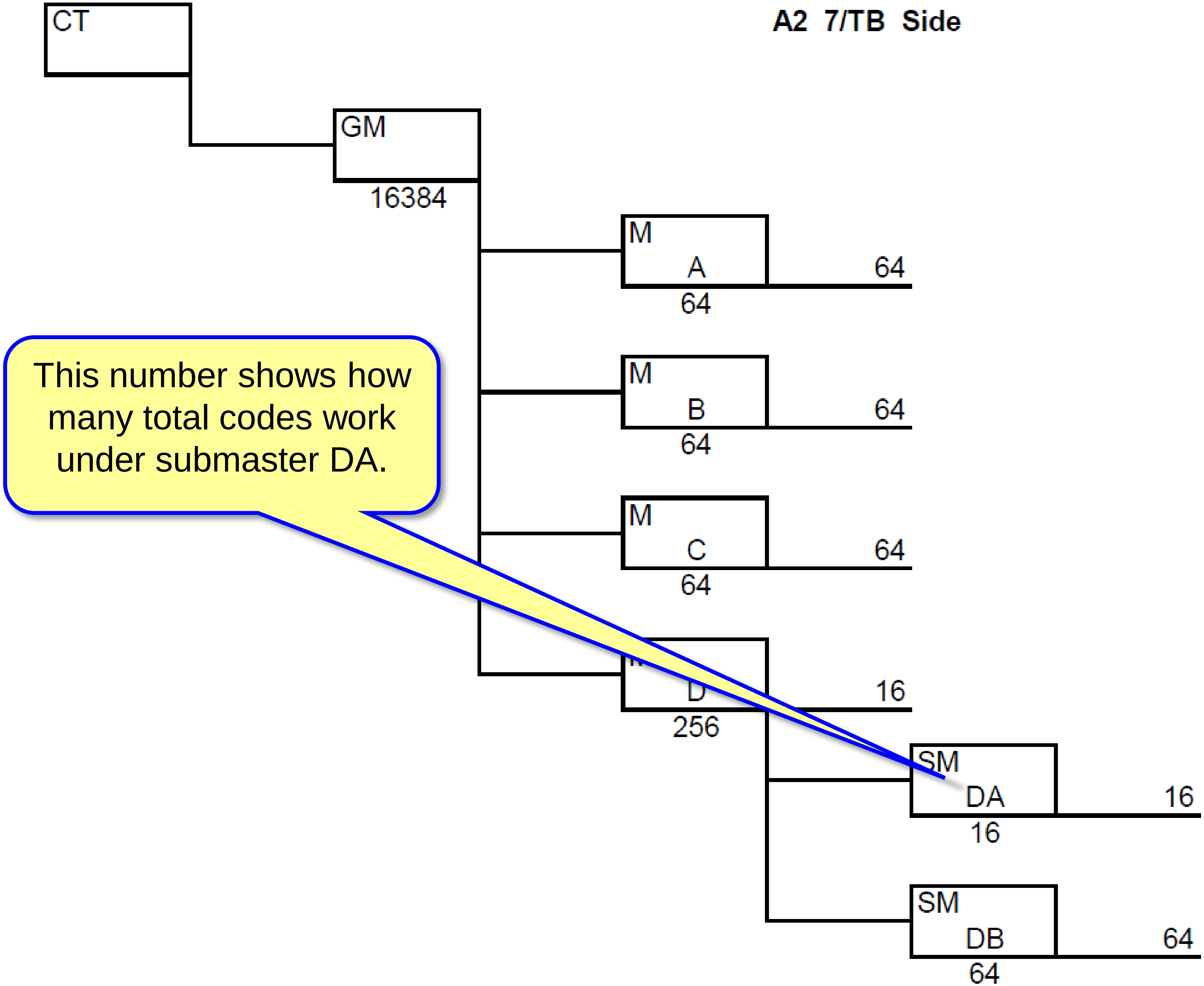
A2 7/TB Side


CT
GM
16384
M
A
64
64
M
B
64
64
M
C
64
64
M
D
256
16
SM
DA
16
16
SM
DB
64
64
DA, DB, etc. are keymarks for submaster keys.

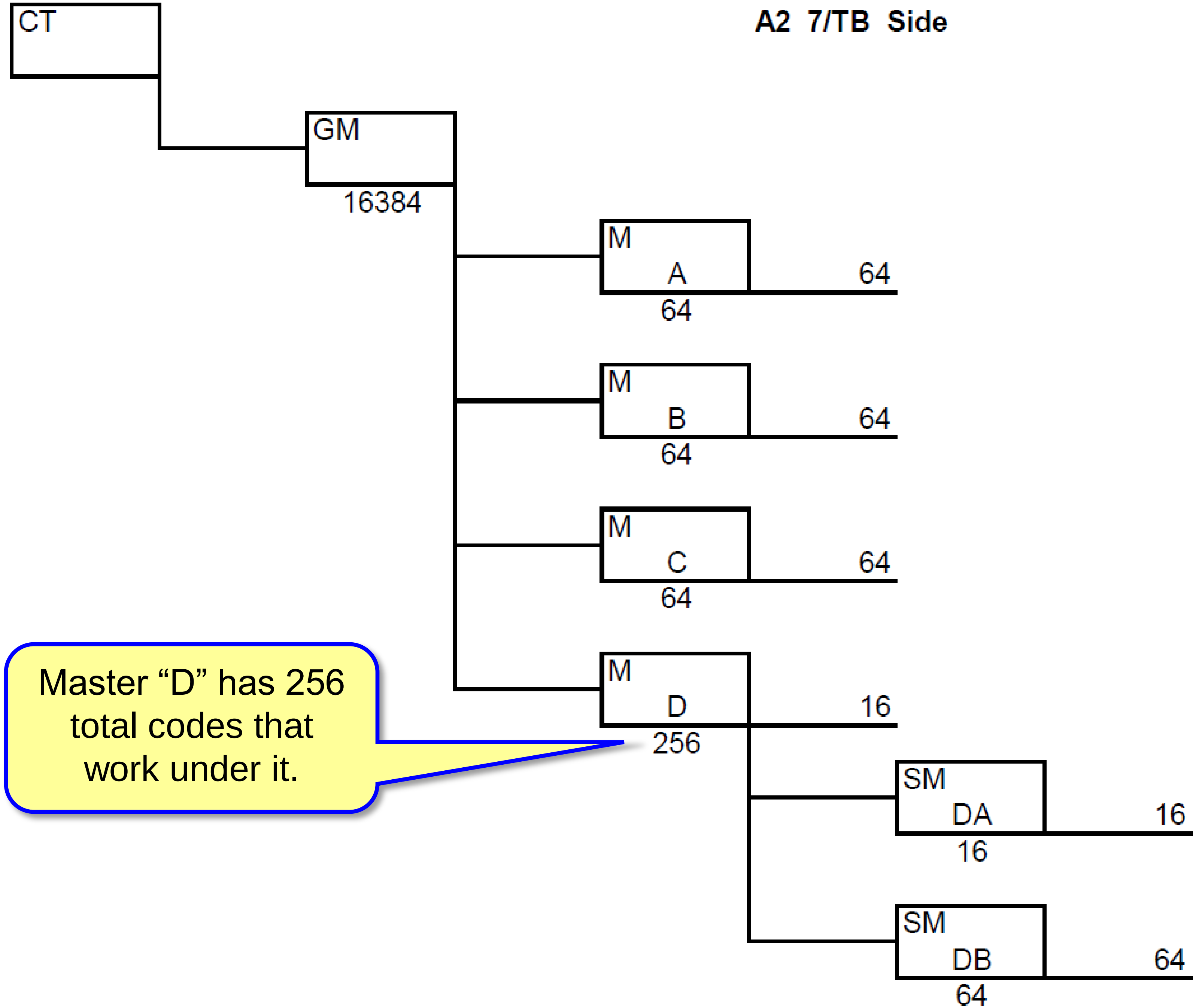

A2 7/TB Side
CT
GM
16384
This number shows how many total codes work under the grandmaster.
M
A
64
64
M
B
64
64
M
C
64
64
M
D
16
256
SM
DA
16
16
SM
DB
64
64



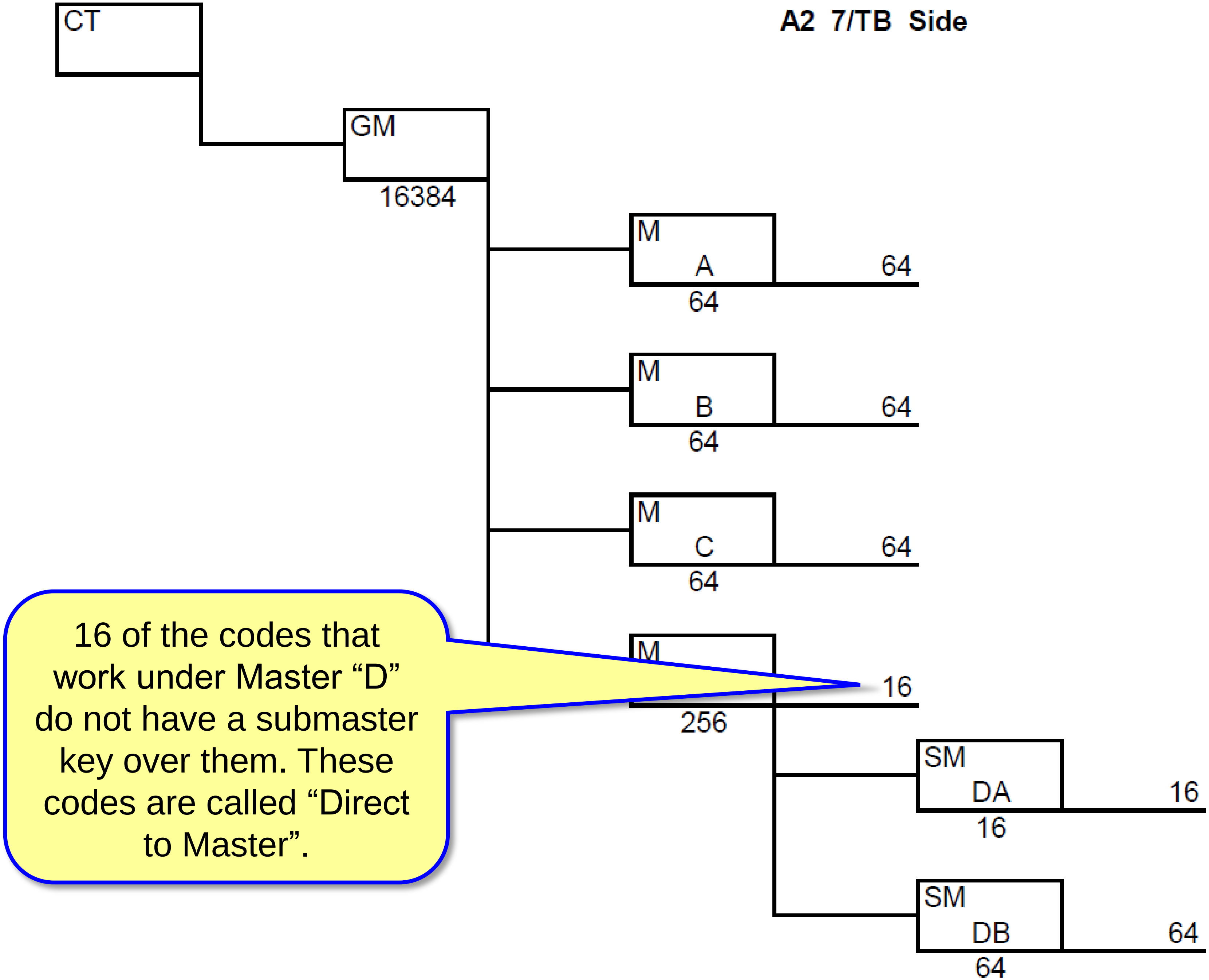
A2 7/TB Side
CT
GM
16384
M
A
64
64
M
B
64
64
M
C
64
64
M
D
16
256
SM
DA
16
16
SM
DB
64
64
This number shows how many total codes work under master A.

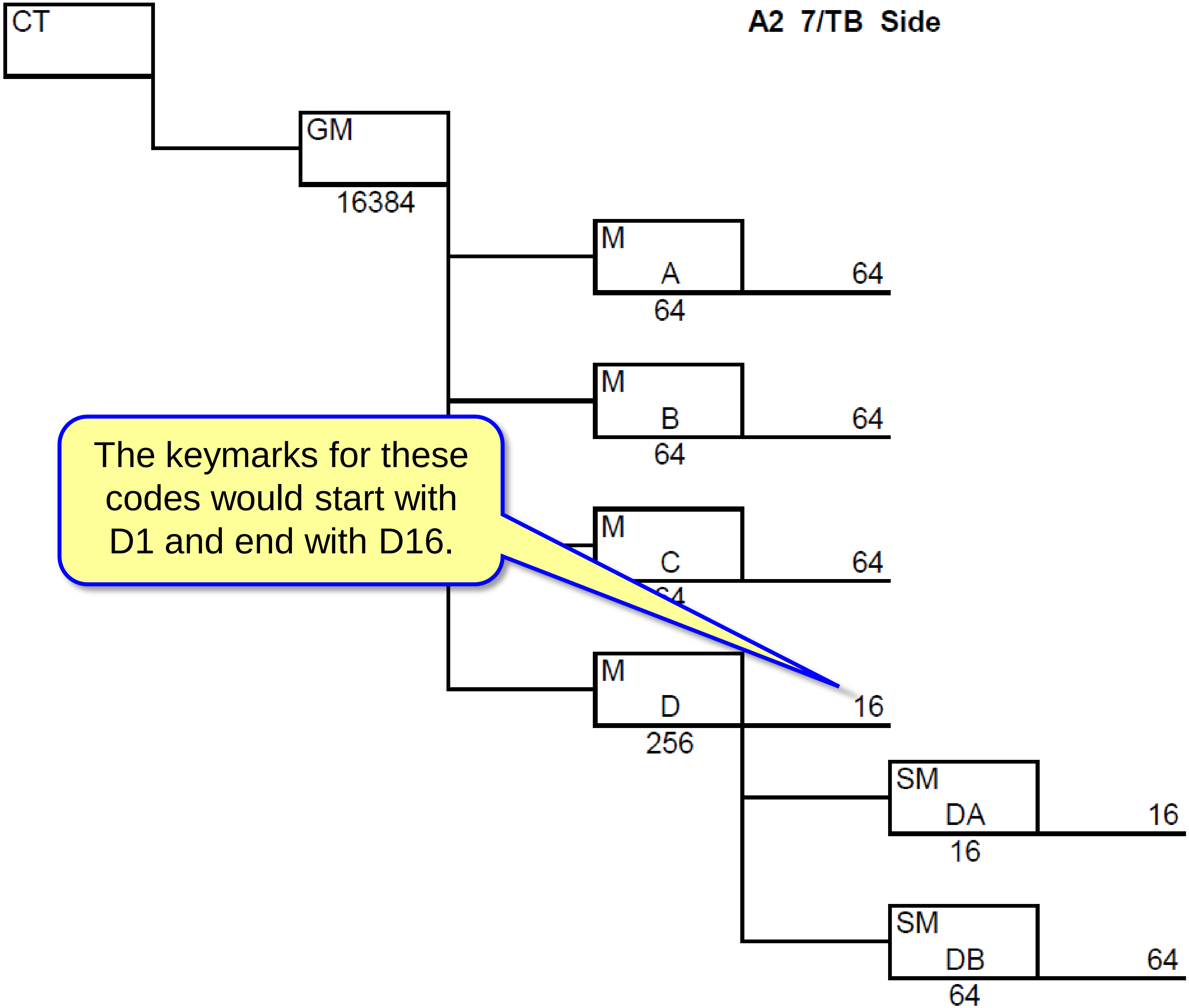

A2 7/TB Side
CT
GM
16384
M
A
64
64
M
B
64
64
M
C
64
64
M
D
16
256
SM
DA
16
16
SM
DB
64
64
This number shows how many total codes work under submaster DA.

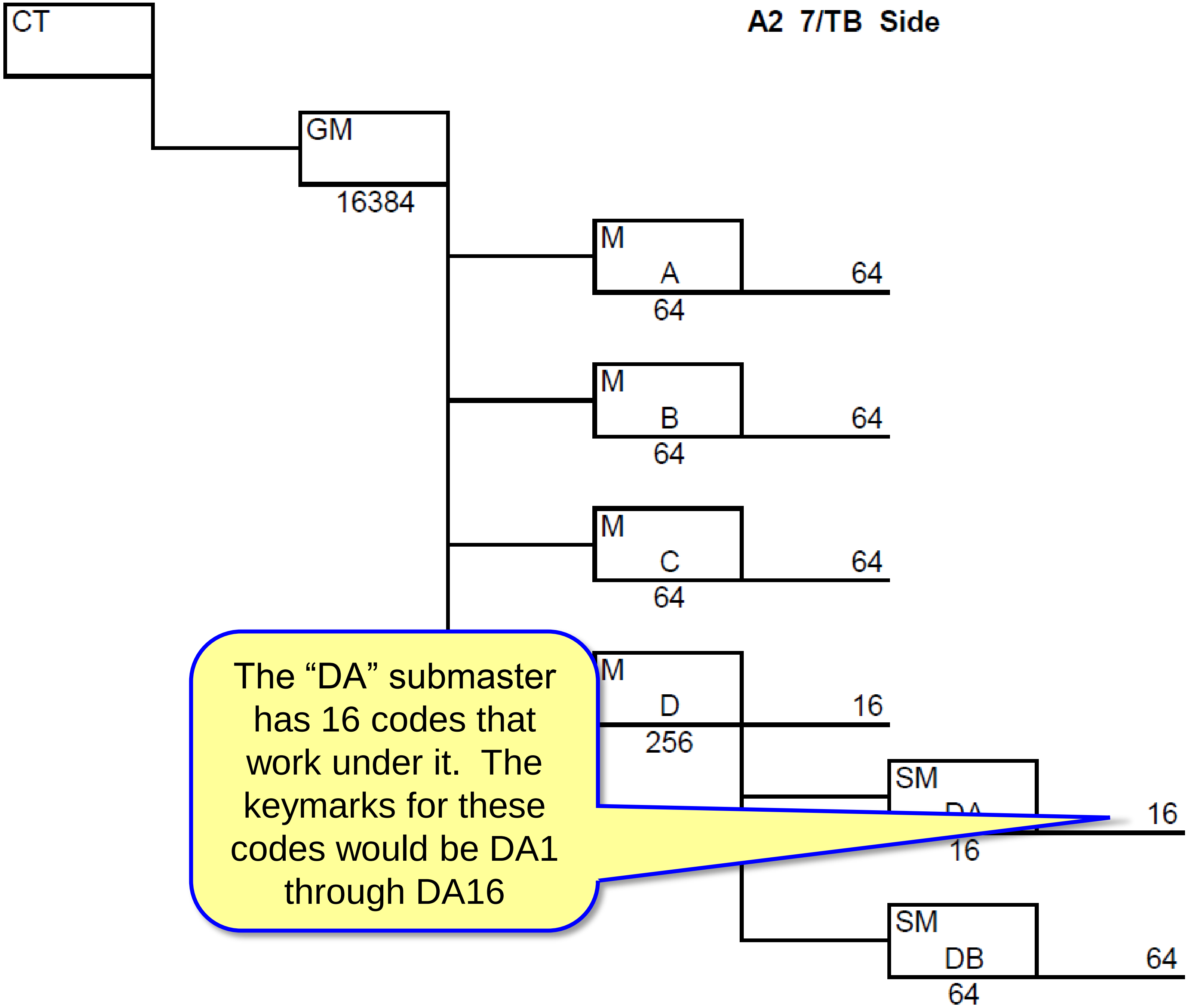
A2 7/TB Side


CT
GM
16384
M
A
64
64
M
B
64
64
M
C
64
64
M
D
16
256
SM
DA
16
16
SM
DB
64
64
Master “D” has 256 total codes that work under it.

A2 7/TB Side


CT
GM
16384
M
A
64
64
M
B
64
64
M
C
64
64
M
16
256
SM
DA
16
16
SM
DB
64
64
16 of the codes that work under Master "D" do not have a submaster key over them. These codes are called "Direct to Master".


A2 7/TB Side
CT
GM
16384
M
A
64
64
M
B
64
64
M
C
64
M
D
16
256
SM
DA
16
16
SM
DB
64
64
The keymarks for these codes would start with D1 and end with D16.



A2 7/TB Side
CT
GM
16384
M
A
64
64
M
B
64
64
M
C
64
64
M
D
16
256
SM
DA
16
16
SM
DB
64
64
The “DA” submaster has 16 codes that work under it. The keymarks for these codes would be DA1 through DA16

BAC18

Q: Where does the BAC18 key belong in a masterkey system hierarchy?

A: Operating Key

Q: What is the keymark of the GM?

A: Usually GM

Q: What is the keymark of the M?

A: B

Q: What is the keymark of the SM?

A: BA

Q: What is the keymark of the SSM?

A: BAC

What keys operate a BAC18 Core?

HIERARCHY	KEYMARK
CONTROL	CT
GRANDMASTER	GM
MASTER	B
SUBMASTER	BA
SUB-SUBMASTER	BAC
OPERATING KEY	BAC18

The markings listed above are all of the keys that will operate the BAC18 core.

CODE PAGE	PROPRIETARY PROPERTY OF STANLEY SECURITY SOLUTIONS	PAGE 1 of 1

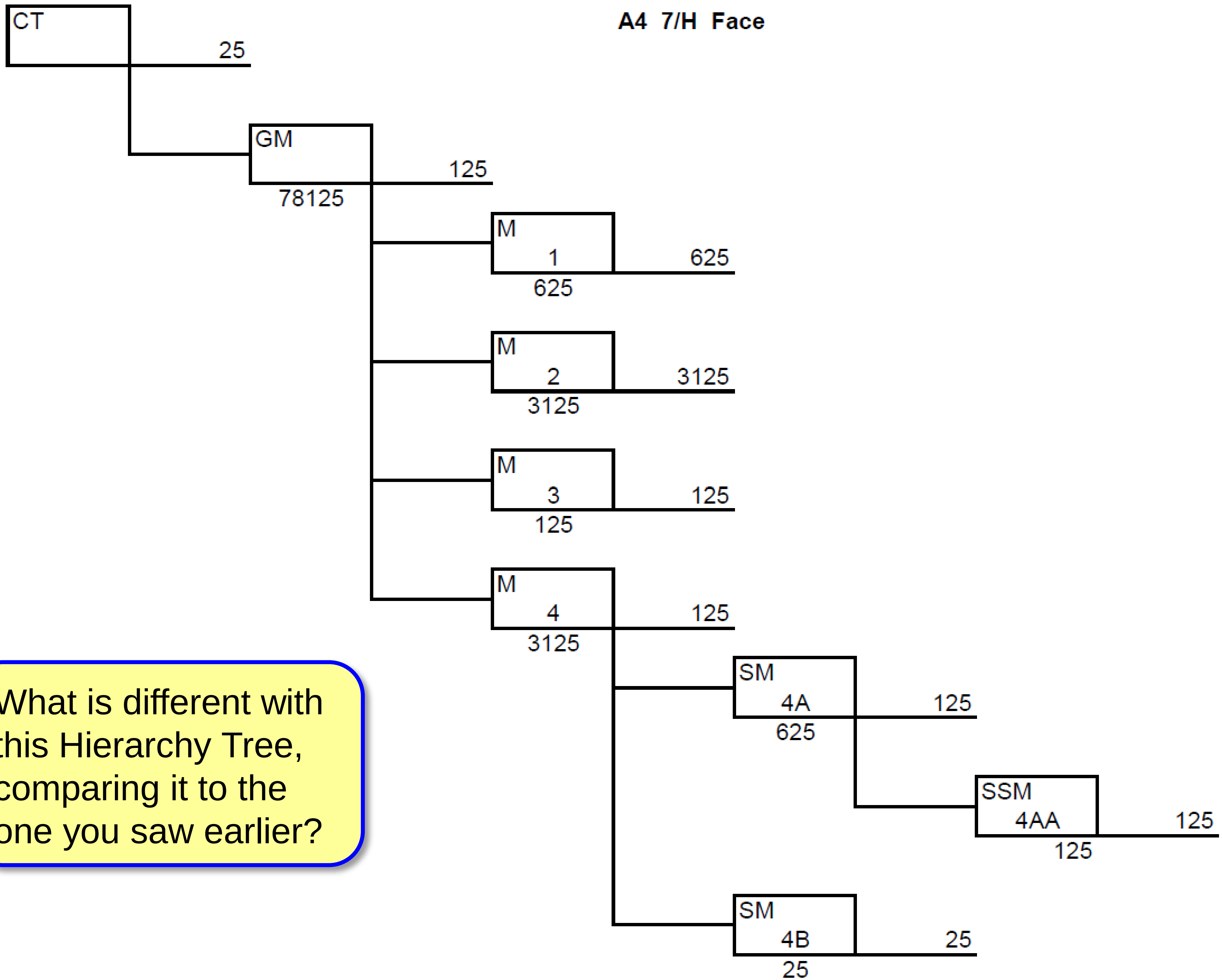
FILE NUMBER: 12345678 **ORDER NO:** 12345 **ORDER LINE #:**1 **JOBID:** 1234 **ACCOUNT ID:** 87654

CURRENT DATE: 2013-02-12 **RECEIVED DATE:** 2013-02-12 **ORDER DATE:** 2013-02-12 **PROMISED DATE:** 2013-02-14

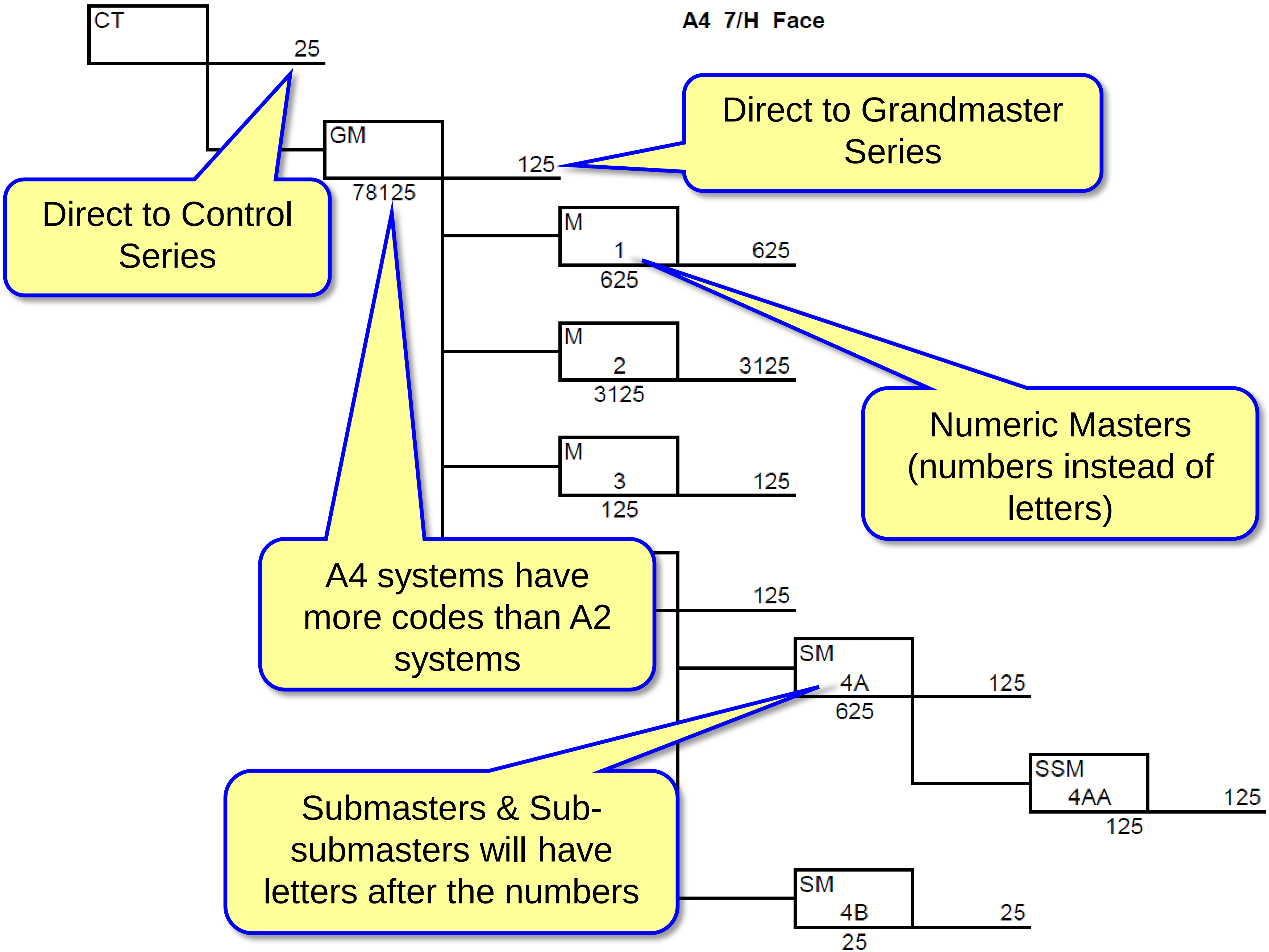
PINS: 7 **TYPE:** A2 **MARK ON:** Side **KEYWAY:** A **KEYSTAMP:** KS473 X KS800

41 89 25 0	CT	41 89 25 0
83 01 83 6	GM	83 01 83 6
67 01 83 6	M B	67 01 83 6
67 83 83 6	SM BA	67 83 83 6

MARK	KEY CODE	OP BY	MARK	KEY CODE	OP BY
SM'BA	67 83 83 6		SM'BA	67 83 83 6	
BA1	67 83 05 8		BA33	67 83 05 2	
BA2	67 83 25 8		BA34	67 83 25 2	
BA3	67 83 45 8		BA35	67 83 45 2	
BA4	67 83 65 8		BA36	67 83 65 2	
	0		BA37	67 83 07 2	
	2		BA38	67 83 27 2	
	4		BA39	67 83 47 2	
BA4X	67 83 65 8	BA1 TO BA3	BA40	67 83 67 2	
BA5	67 83 07 8		BA41	67 83 09 2	
BA6	67 83 27 8		BA42	67 83 29 2	
BA7	67 83 47 8		BA43	67 83 49 2	
BA8	67 83 67 8		BA44	67 83 69 2	
BA9	67 83 09 8			2	
BA10	67 83 29 8			4	
BA11	67 83 49 8		BA44X	67 83 69 2	BA42;BA43
BA12	67 83 69 8		BA45	67 83 01 2	
BA13	67 83 01 8		BA46	67 83 21 2	
BA14	67 83 21 8		BA47	67 83 41 2	
BA15	67 83 41 8		BA48	67 83 61 2	
BA16	67 83 61 8		BA49	67 83 05 4	
BA17	67 83 05 0		BA50	67 83 25 4	
BA18	67 83 25 0		BA51	67 83 45 4	
BA19	67 83 45 0		BA52	67 83 65 4	
BA20	67 83 65 0		BA53	67 83 07 4	
BA21	67 83 07 0		BA54	67 83 27 4	
BA22	67 83 27 0		BA55	67 83 47 4	
BA23	67 83 47 0		BA56	67 83 67 4	
BA24	67 83 67 0		BA57	67 83 09 4	
BA25	67 83 09 0		BA58	67 83 29 4	
BA26	67 83 29 0		BA59	67 83 49 4	
BA27	67 83 49 0		BA60	67 83 69 4	
BA28	67 83 69 0		BA61	67 83 01 4	
BA29	67 83 01 0		BA62	67 83 21 4	
BA30	67 83 21 0		BA63	67 83 41 4	
BA31	67 83 41 0			05 8	
BA32	67 83 61 0			27 0	
				49 2	
			BA64X	67 83 61 4	ALL SM'BA



What is different with this Hierarchy Tree, comparing it to the one you saw earlier?


A4 7/H Face
CT
25
GM
125
78125
M
1
625
625
M
2
3125
3125
M
3
125
125
125
SM
4A
125
625
SSM
4AA
125
125
SM
4B
25
25
Direct to Control Series
Direct to Grandmaster Series
Numeric Masters (numbers instead of letters)
A4 systems have more codes than A2 systems
Submasters & Sub-submasters will have letters after the numbers

CODE PAGE **PROPRIETARY PROPERTY OF STANLEY SECURITY SOLUTIONS**

FILE NUMBER: 8765431 **ORDER NO:** 54321 **ORDER LINE #:** 1 **JOBID: 4321** **ACCOUNT ID:** 87654

CURRENT DATE: 2013-02-12 **RECEIVED DATE:** 2013-02-12 **ORDER DATE:** 2013-02-12 **PROMISED DATE:** 2013-02-14

PINS: 7 **TYPE:** A4 **MARK ON:** Front **KEYWAY:** WC **KEYSTAMP:** KS609 X KS800

32 54 01 2	**CT**	32 54 01 2
20 31 54 4	**GM**	20 31 54 4
45 13 04 4	**M 1**	45 13 04 4

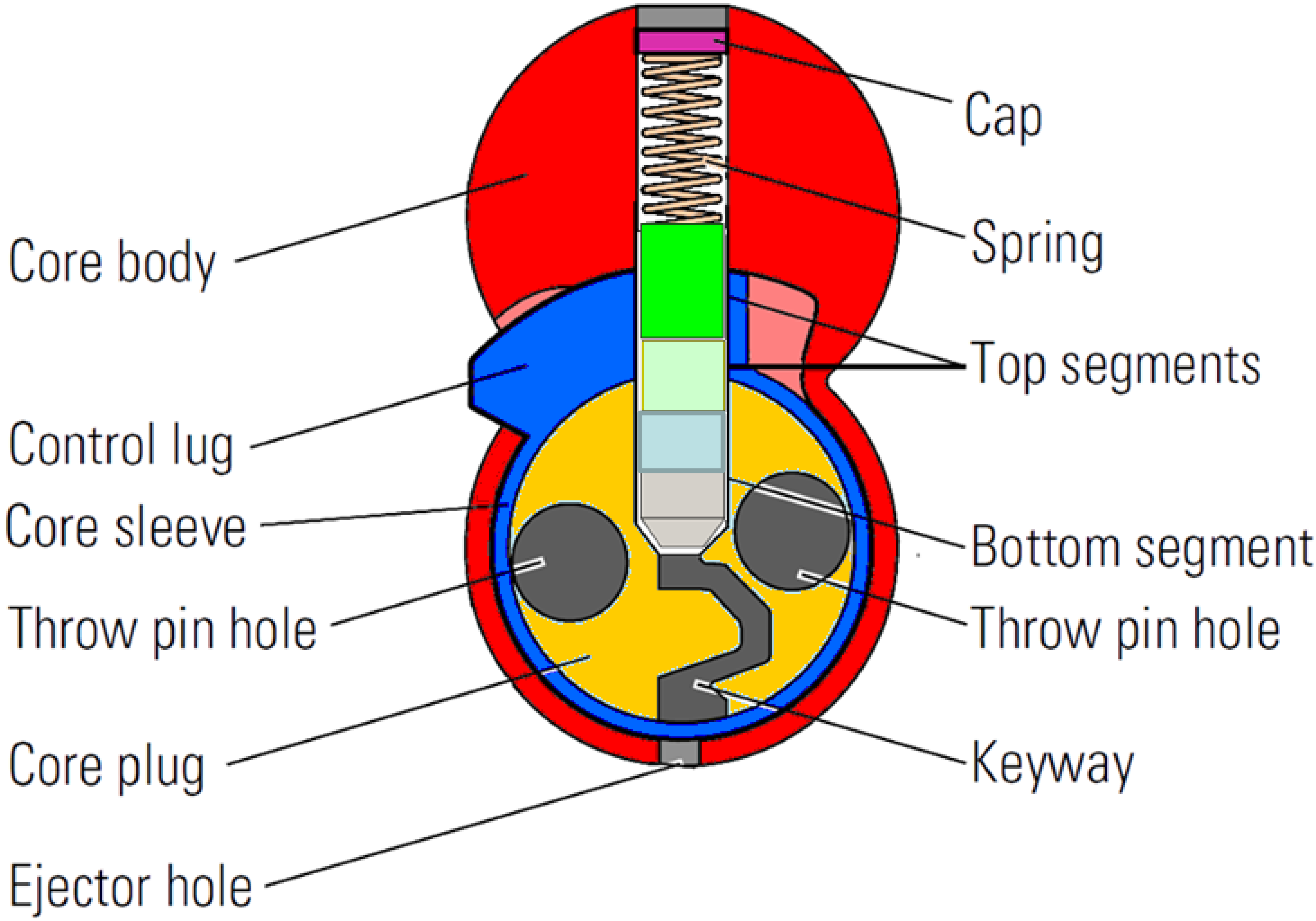
MARK	KEY CODE	OP BY	MARK	KEY CODE	OP BY
M'1	45 13 04 4				
1-1	45 13 03 5				
1-2	45 13 02 3				
1-3	45 13 05 5				
1-4	45 13 00 3				
1-5	45 13 02 0				
1-6	45 13 01 2				
1-7	45 13 01 5				
1-8	45 13 02 1				
1-9	45 13 00 0				
1-10	45 13 03 2				
1-11	45 13 00 2				
1-12	45 13 00 1				
1-13	45 13 01 1				
1-14	45 13 05 2				
1-15	45 13 02 2				
1-16	45 13 05 0				
1-17	45 13 05 1				
1-18	45 13 00 5				
1-19	45 13 03 1				
1-20	45 13 03 0				
1-21	45 13 05 3				
1-22	45 13 02 5				
1-23	45 13 01 3				
1-24	45 13 01 0				
1-25	45 13 03 3				

This a sample of a “Numeric Masters” code page

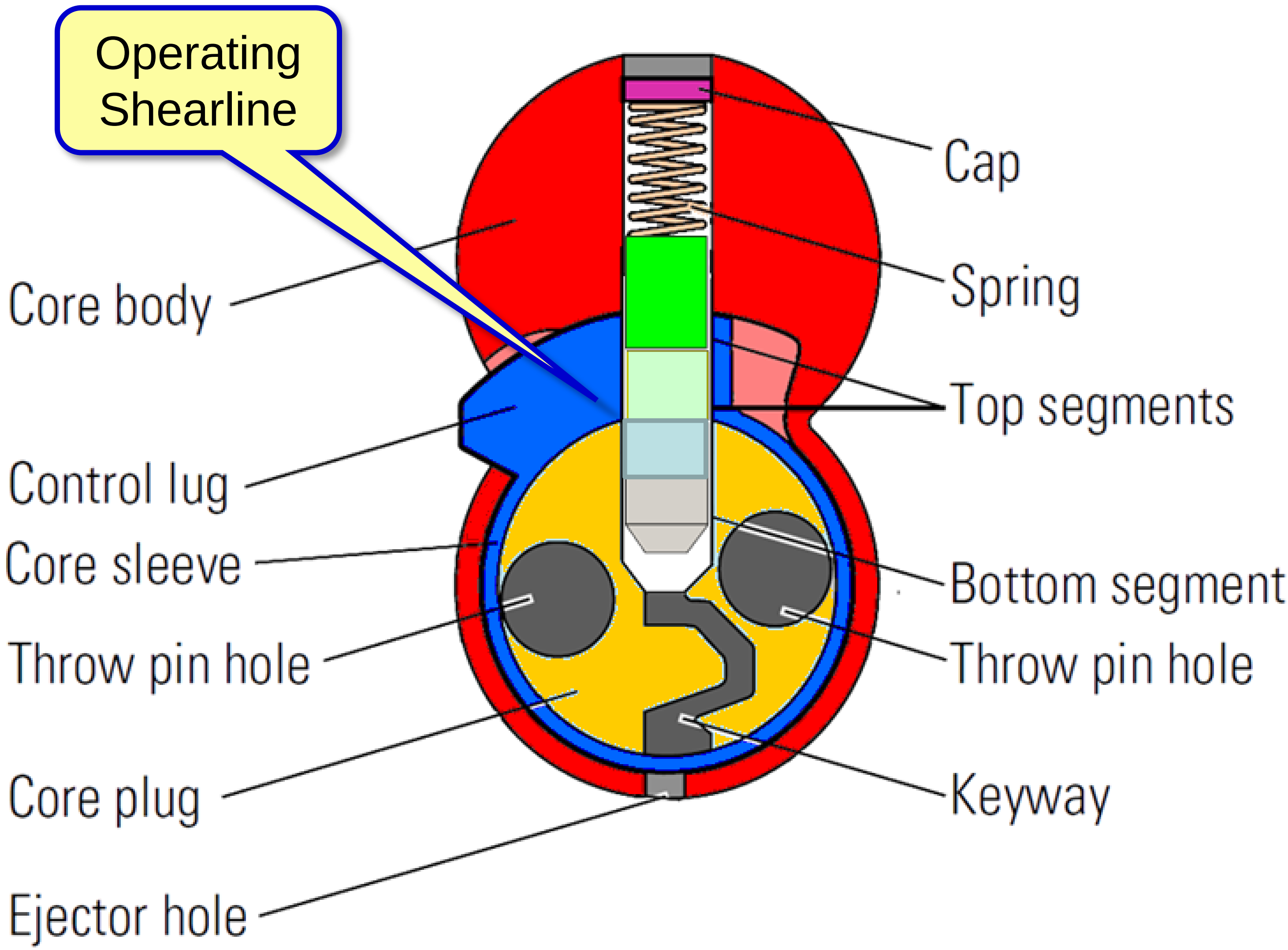
A2 Key System:

Calculating Pin Segments

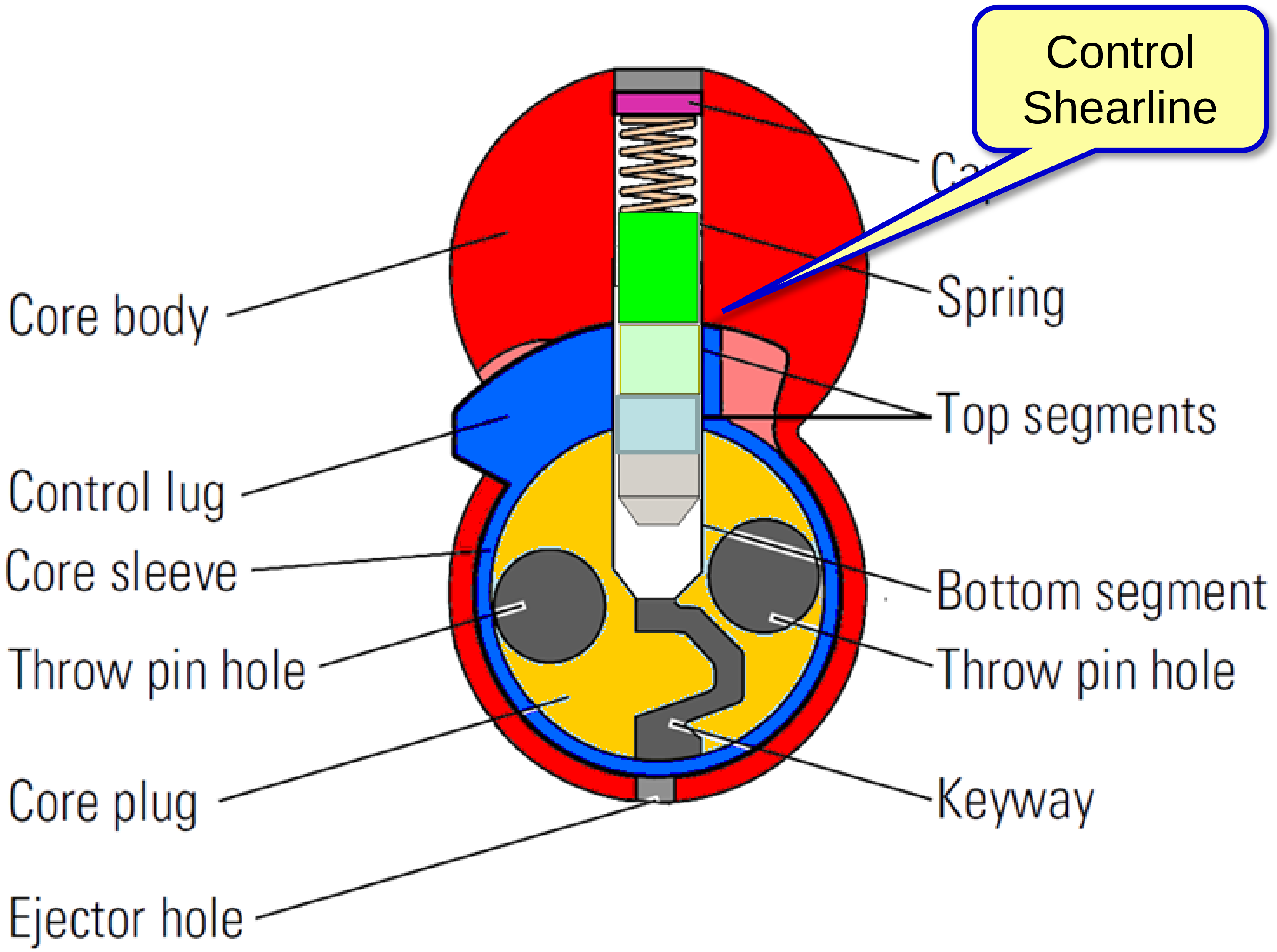
BEST Interchangeable Core Terminology
(Front Cut-Away View)



BEST Interchangeable Core
with Pins at Operating Shearline



BEST Interchangeable Core
with Pins at Control Shearline



CODE PAGE **PROPRIETARY PROPERTY OF STANLEY SECURITY SOLUTIONS** PAGE 1 of 1

FILE NUMBER: 12345678 ORDER NO: 12345 ORDER LINE #:1 JOBID: 1234 ACCOUNT ID: 87654

CURRENT DATE: 2013-02-12 RECEIVED DATE: 2013-02-12 ORDER DATE: 2013-02-12 PROMISED DATE: 2013-02-14

PINS: 7 TYPE: A2 MARK ON: Side KEYWAY: A KEYSTAMP: KS473 X KS800

41 89 25 0	CT	41 89 25 0
83 01 83 6	GM	83 01 83 6
67 01 83 6	M B	67 01 83 6
67 83 83 6	SM BA	67 83 83 6

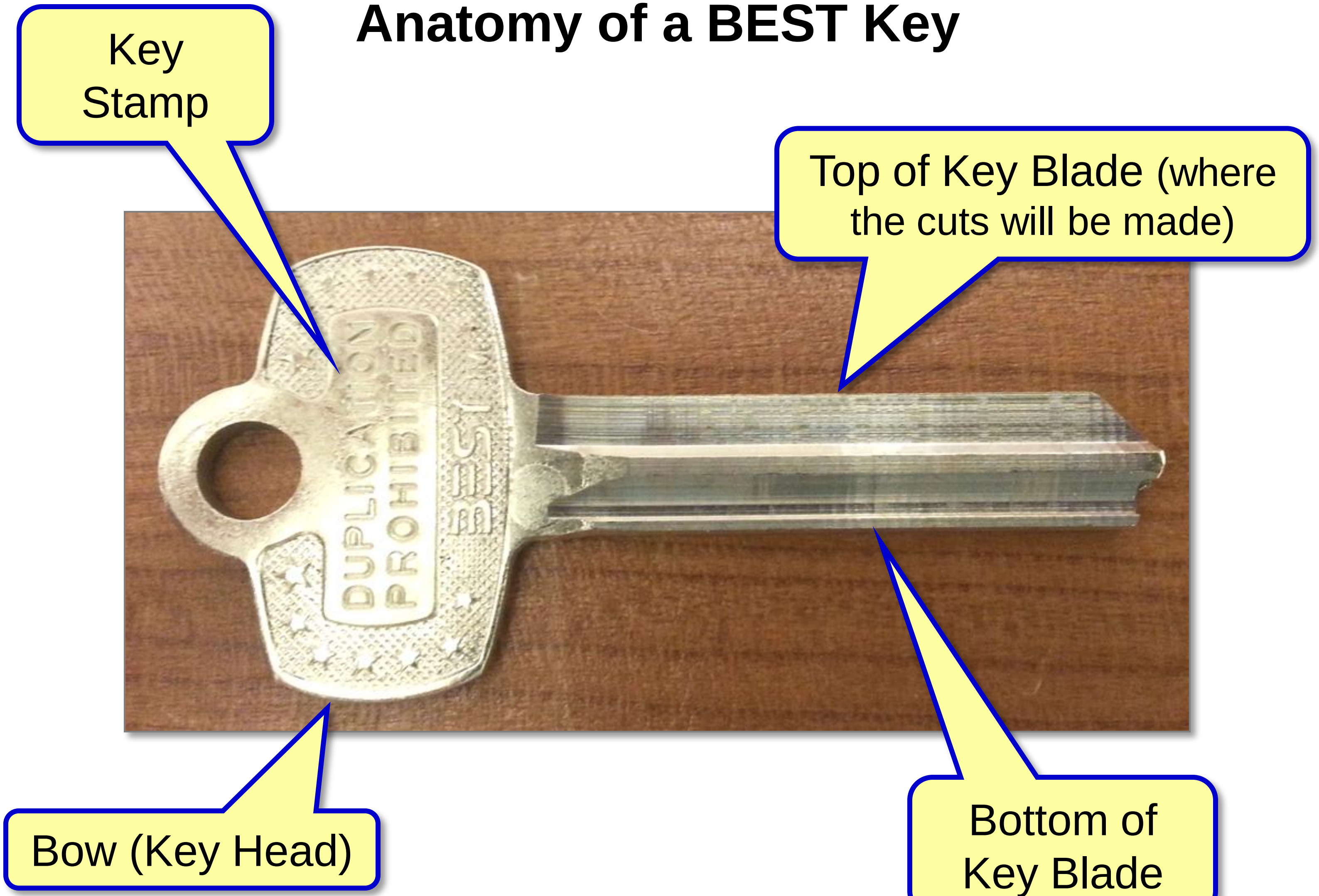
MARK	KEY CODE	OP BY	MARK	KEY CODE	OP BY
SM'BA	67 83 83 6		SM'BA	67 83 83 6	
BA1	67 83 05 8		BA33	67 83 05 2	
BA2	67 83 25 8		BA34	67 83 25 2	
BA3	67 83 45 8		BA35	67 83 45 2	
BA4	67 83 65 8		BA36	67 83 65 2	
	0		BA37	67 83 07 2	
	2		BA38	67 83 27 2	
	4		BA39	67 83 47 2	
BA4X	67 83 65 8	BA1 TO BA3	BA40	67 83 67 2	
BA5	67 83 07 8		BA41	67 83 09 2	
BA6	67 83 27 8			3 29 2	
BA7	67 83 47 8			3 49 2	
BA8	67 83 67 8			3 69 2	
BA9	67 83 09 8			2	
BA10	67 83 29 8			4	
BA11	67 83 49 8			3 69 2	BA42;BA43
BA12	67 83 69 8			3 01 2	
BA13	67 83 01 8			3 21 2	
BA14	67 83 21 8		BA47	67 83 41 2	
BA15	67 83 41 8		BA48	67 83 61 2	
BA16	67 83 61 8		BA49	67 83 05 4	
BA17	67 83 05 0		BA50	67 83 25 4	
BA18	67 83 25 0		BA51	67 83 45 4	
BA19	67 83 45 0		BA52	67 83 65 4	
BA20	67 83 65 0		BA53	67 83 07 4	
BA21	67 83 07 0		BA54	67 83 27 4	
BA22	67 83 27 0		BA55	67 83 47 4	
BA23	67 83 47 0		BA56	67 83 67 4	
BA24	67 83 67 0		BA57	67 83 09 4	
BA25	67 83 09 0		BA58	67 83 29 4	
BA26	67 83 29 0		BA59	67 83 49 4	
BA27	67 83 49 0		BA60	67 83 69 4	
BA28	67 83 69 0		BA61	67 83 01 4	
BA29	67 83 01 0		BA62	67 83 21 4	
BA30	67 83 21 0		BA63	67 83 41 4	
BA31	67 83 41 0			05 8	
BA32	67 83 61 0			27 0	
				49 2	
			BA64X	67 83 61 4	ALL SM'BA

We use Codes from Code Pages for cutting keys.

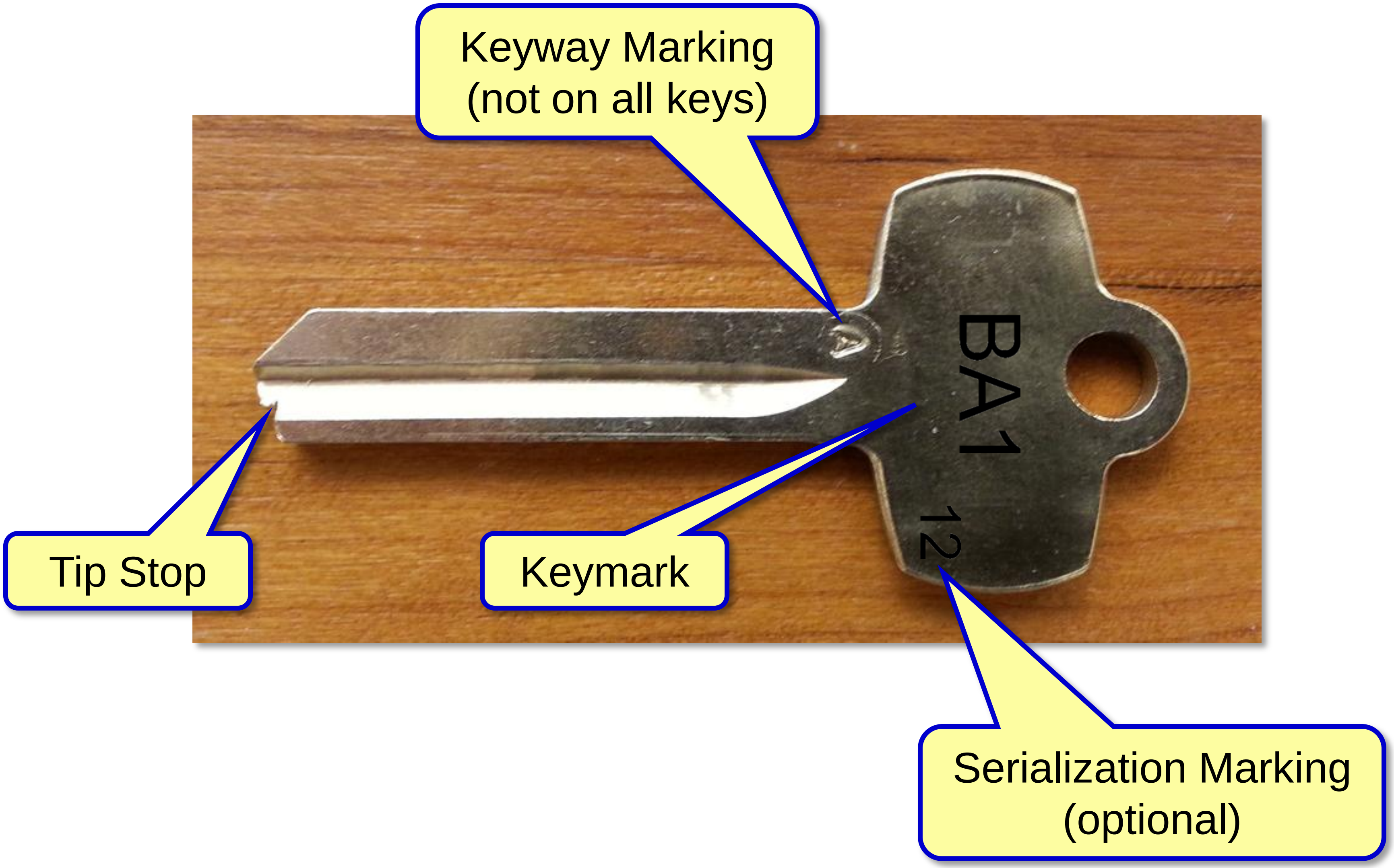
The BEST AD433 Key Combinator



Anatomy of a BEST Key



Anatomy of a BEST Key



Loading Keys

Gripping the key clamp knob, pull the key carriage completely forward (toward you).

Turn the key clamp knob counterclockwise to open the key clamp.



With the curved edge of the key blank (bottom edge) against the locating surface, slide the key blank into the key opening.



Make sure the “Knife Edge” of the key clamp fits into the groove of the key.

Turn the key clamp knob clockwise to lock the blank in place.



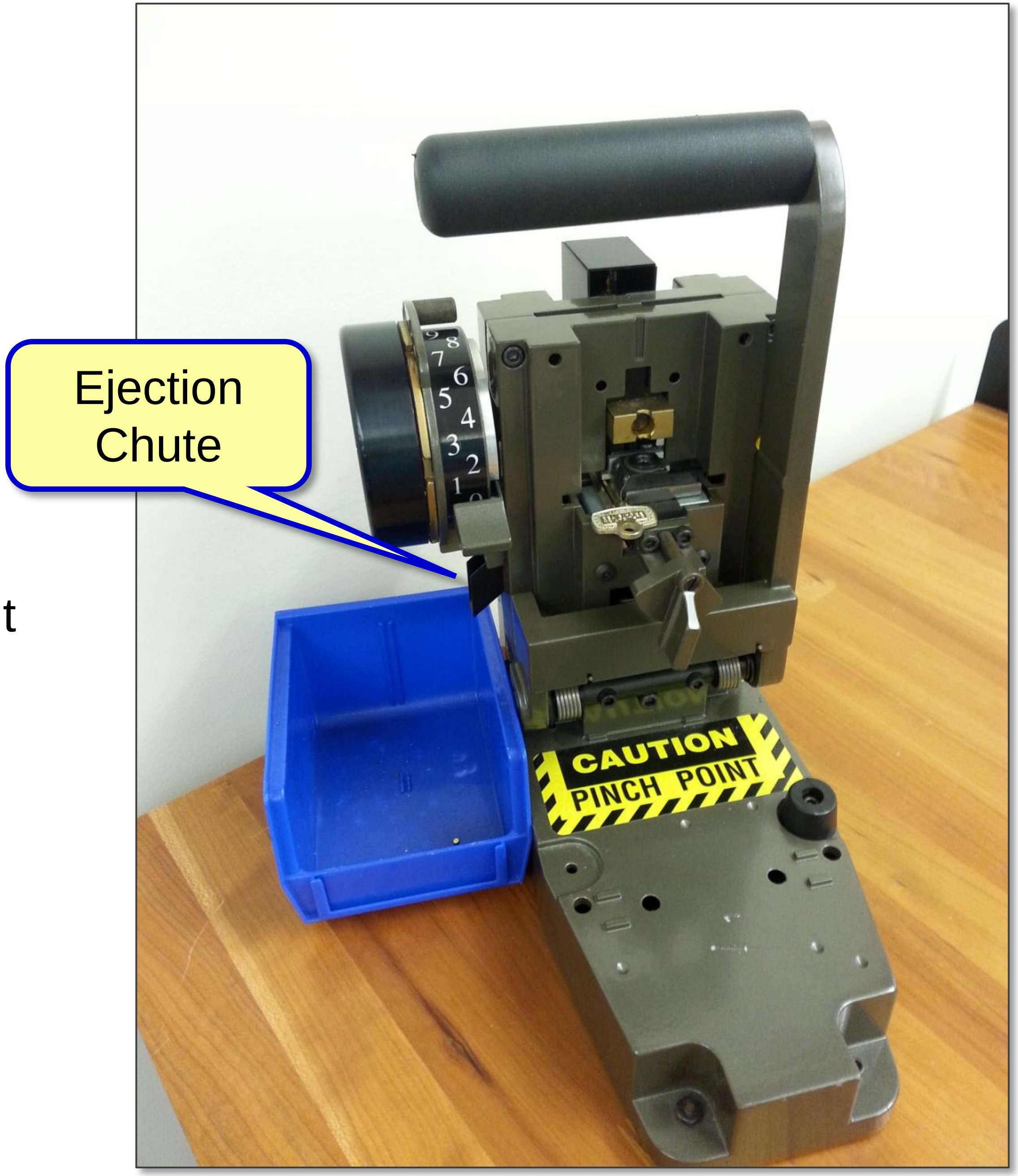
Cutting Keys



Make sure the Key Carriage is completely forward (toward you) before cutting the key.



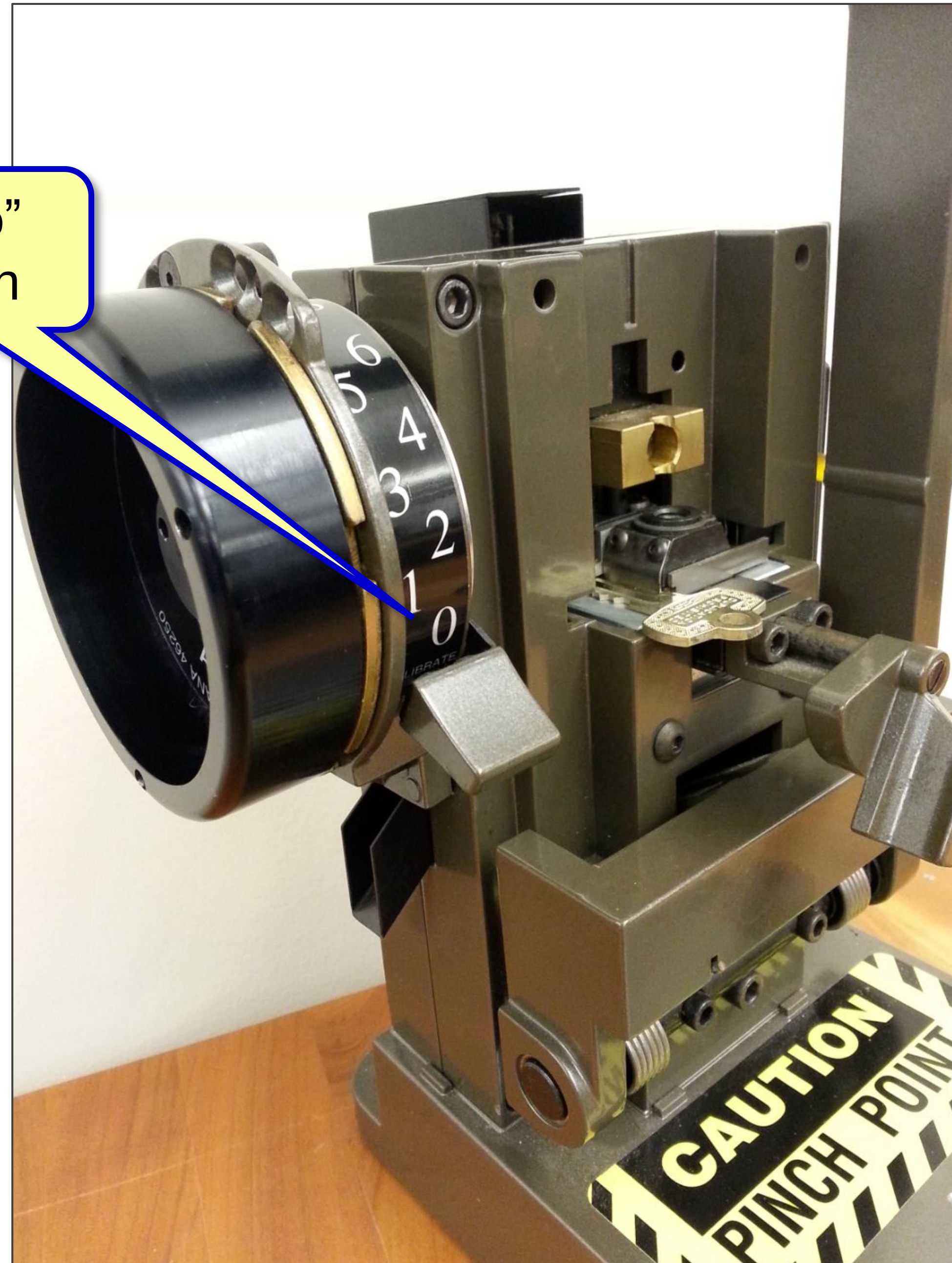
Place the Chip Tray under the Ejection Chute to catch the cut pieces of the keys.



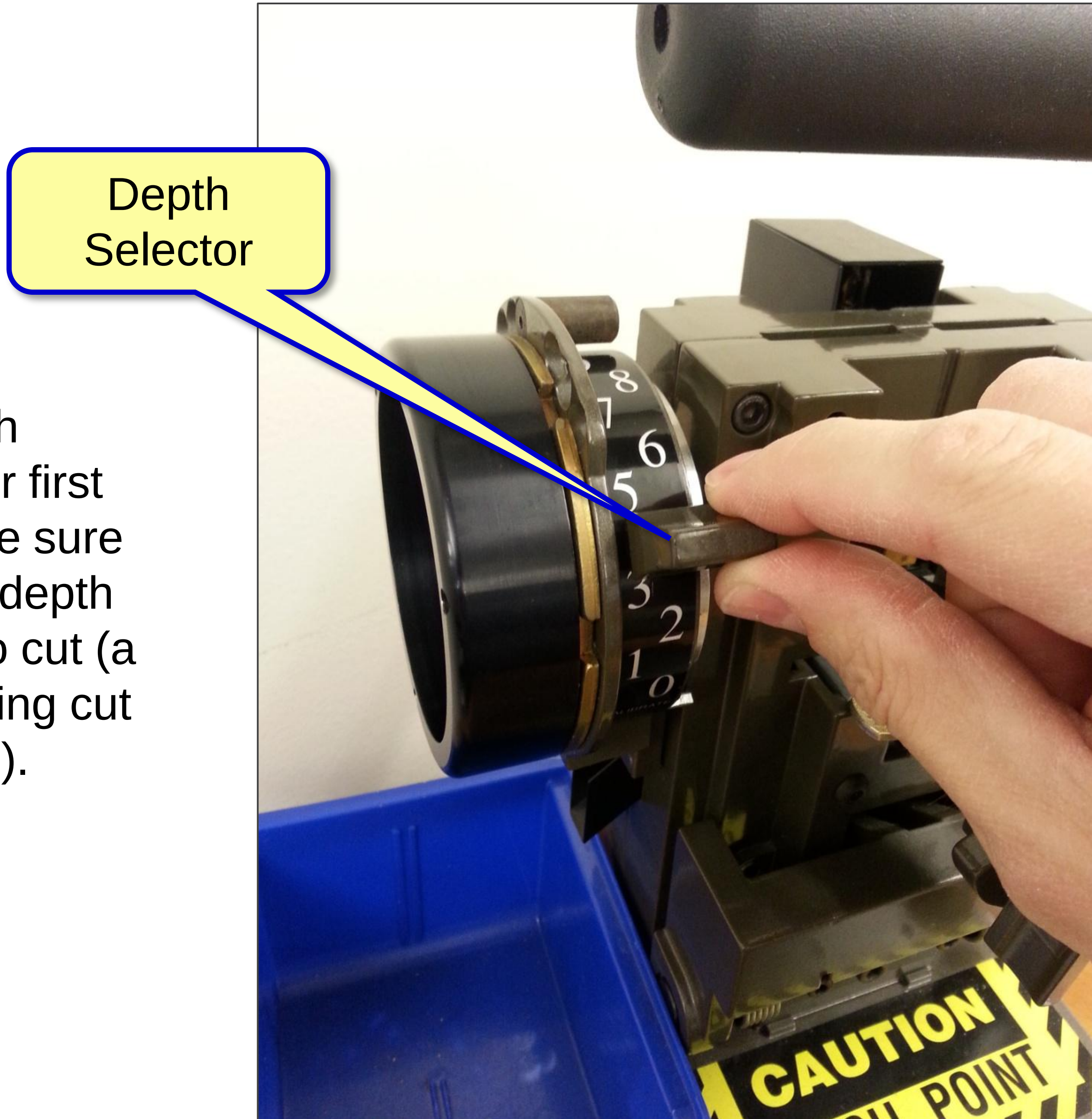
NOTE:

ZERO is not all of the way down on the Cut Depth Indicator. Zero is one “notch” up.

The bottom position is used for cutting a “Calibration Key” for adjusting the depth of cut.

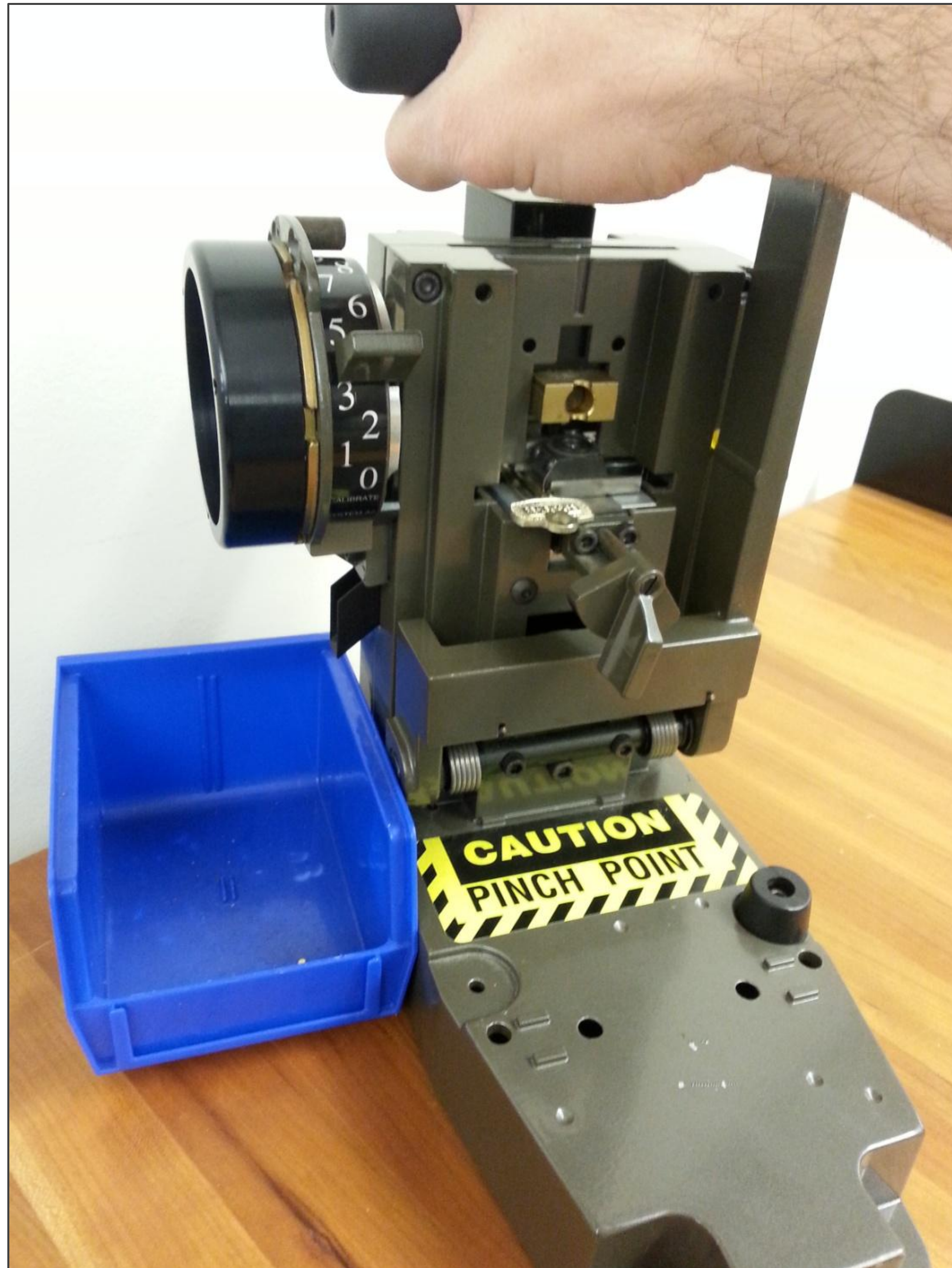


Move the Depth Selector to your first cut depth. Make sure to COVER the depth that you plan to cut (a # 4 depth is being cut in this example).



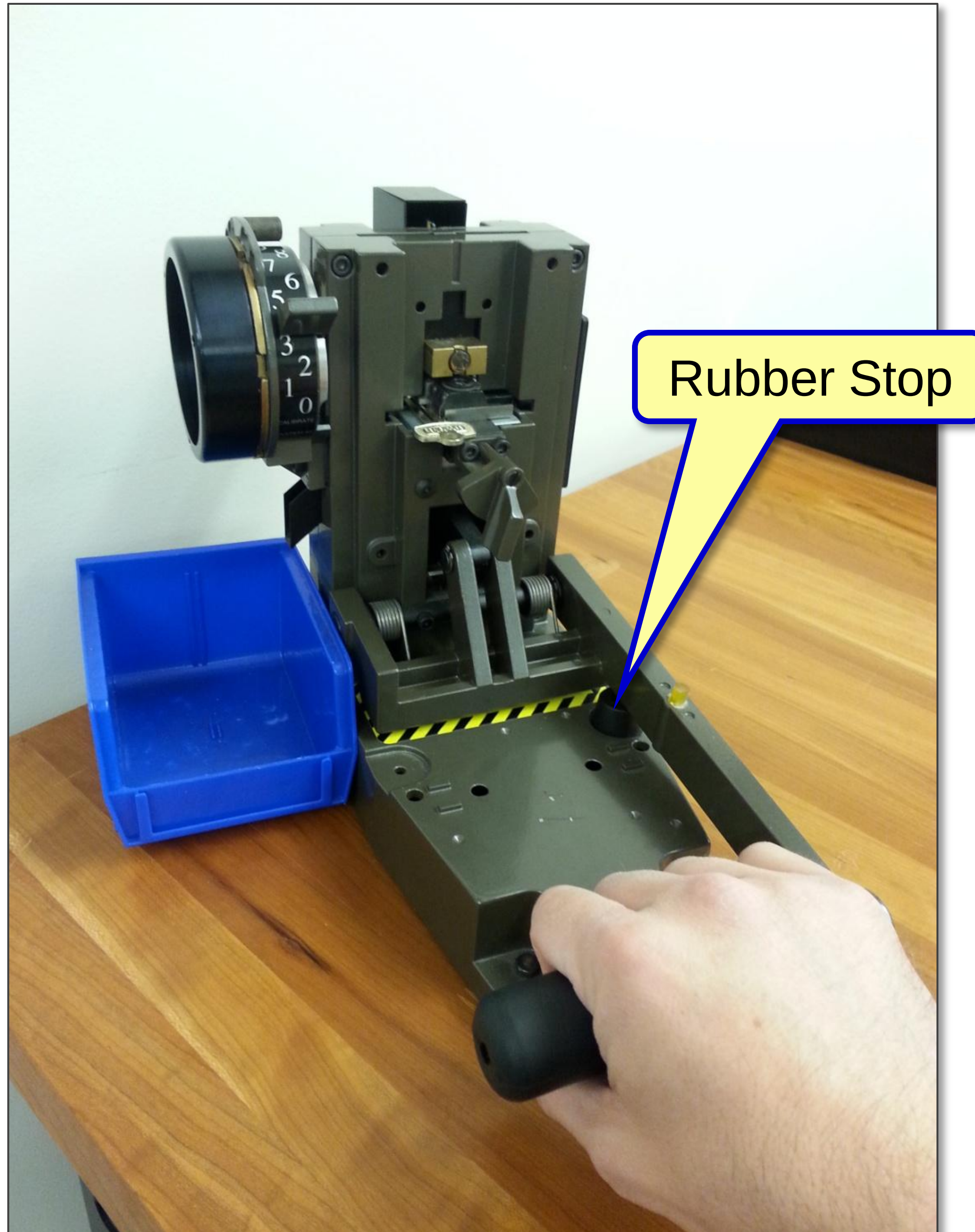
NOTE:

The first pull of the handle does not make a cut, it just sets the blank in the correct position for the first cut.

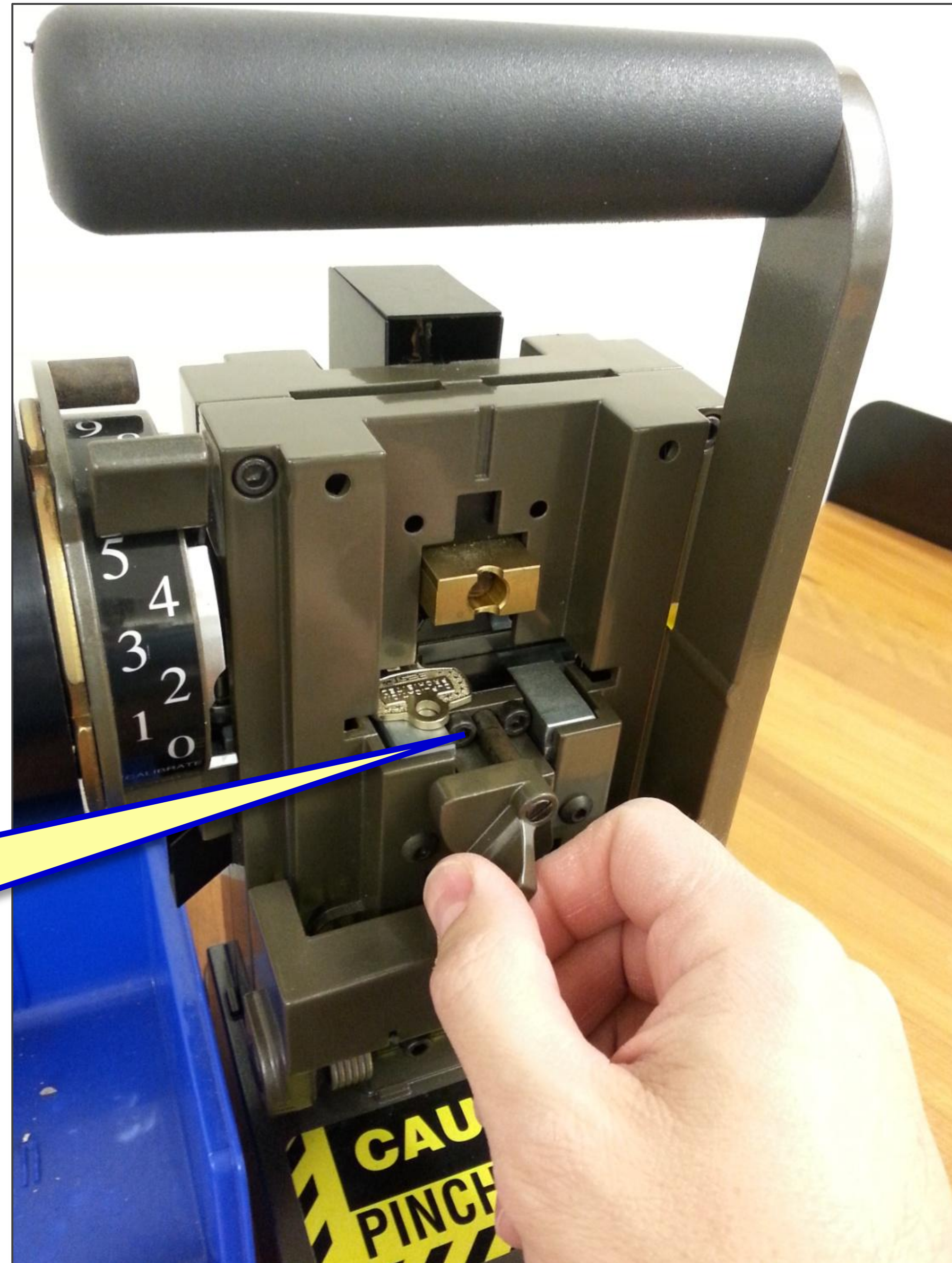


Pull the handle twice for the first cut and once for each additional cut.

Make sure the handle is completely depressed until it contacts the rubber stop on the base.



The Key Combinator will advance the blank with each handle pull.



Key Carriage shown fully advanced

Pull the key clamp knob and carriage toward you when the key is finished being cut.



Turn the key clamp knob counter clockwise to release the key clamp and remove the cut key.



The Cut Key



Calculating Pin Lengths

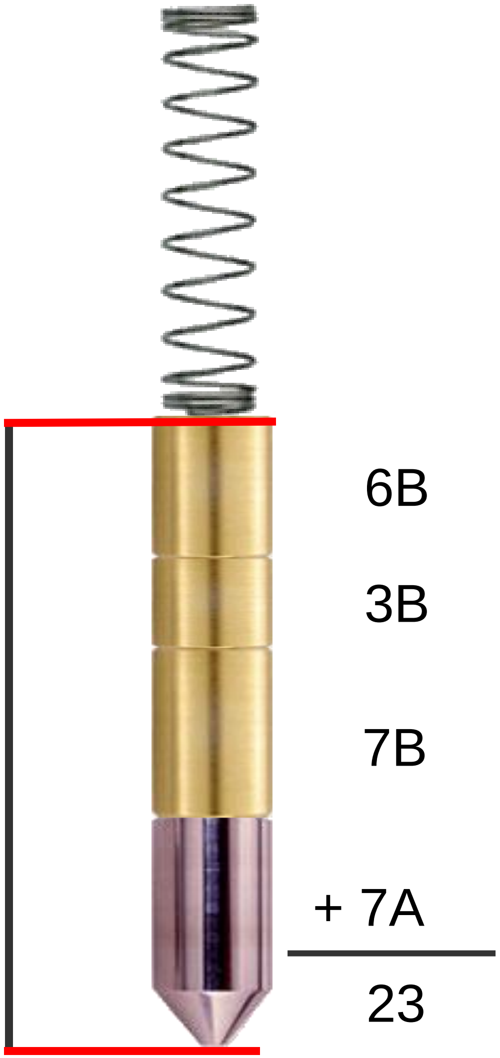
The Stack Height (or Total Stack) equals the sum of a barrel's pin lengths. Having a consistent Stack Height ensures that there is enough overall pin stack length to lock both shearlines and enough overhead room for the springs to fully compress without being crushed.



Stack Height (or Total Stack)

There is a simple process for calculating pin lengths and a consistent Stack Height.

(An A2 System Stack Height example is shown at right)



BA1 Example

The **Total Stack** in a standard BEST **A2** system is **23** *(The Total Stack is the sum total of all pin segments in a barrel).*

Enter the **Total Stack** in the code chart for all barrels.

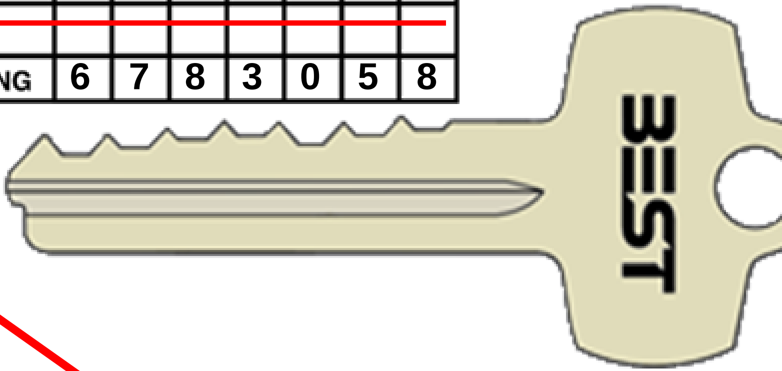
Add **10** to each cut of the **Control** Key and record the numbers on the chart.

*(**10** is added to the Control Key cuts to compensate for the thickness of the control lug, which is ten "increments" thick)*

Forgetting to add 10 to the control cuts is the cause of many combinating problems.

Record the **Grand Master** and **Individual Operating Key** on the appropriate lines on the chart.

Barrel #	1	2	3	4	5	6	7
TOTAL STACK	23	23	23	23	23	23	23
CONTROL	14	11	18	19	12	15	10
GRAND MASTER	8	3	0	1	8	3	6
~~MASTER~~							
~~SUB MASTER~~							
IND. OPERATING	6	7	8	3	0	5	8



Keys Codes from Sample Code Page:

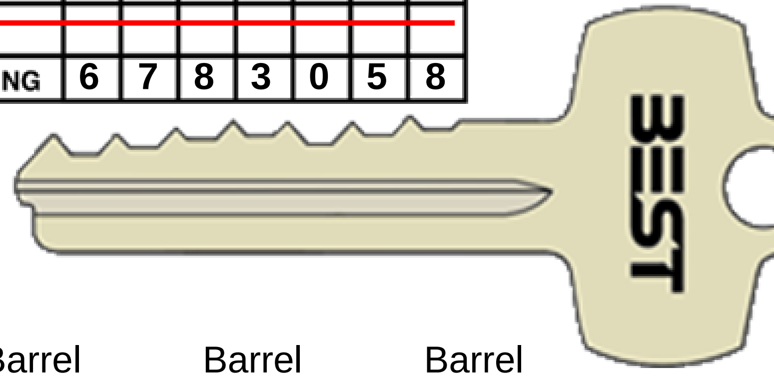
CONTROL (CT)	4189250
GRAND MASTER (GM)	8301836
MASTER (B)	6701836
SUB-MASTER (BA)	6783836
OPERATING KEY (BA1)	6783058

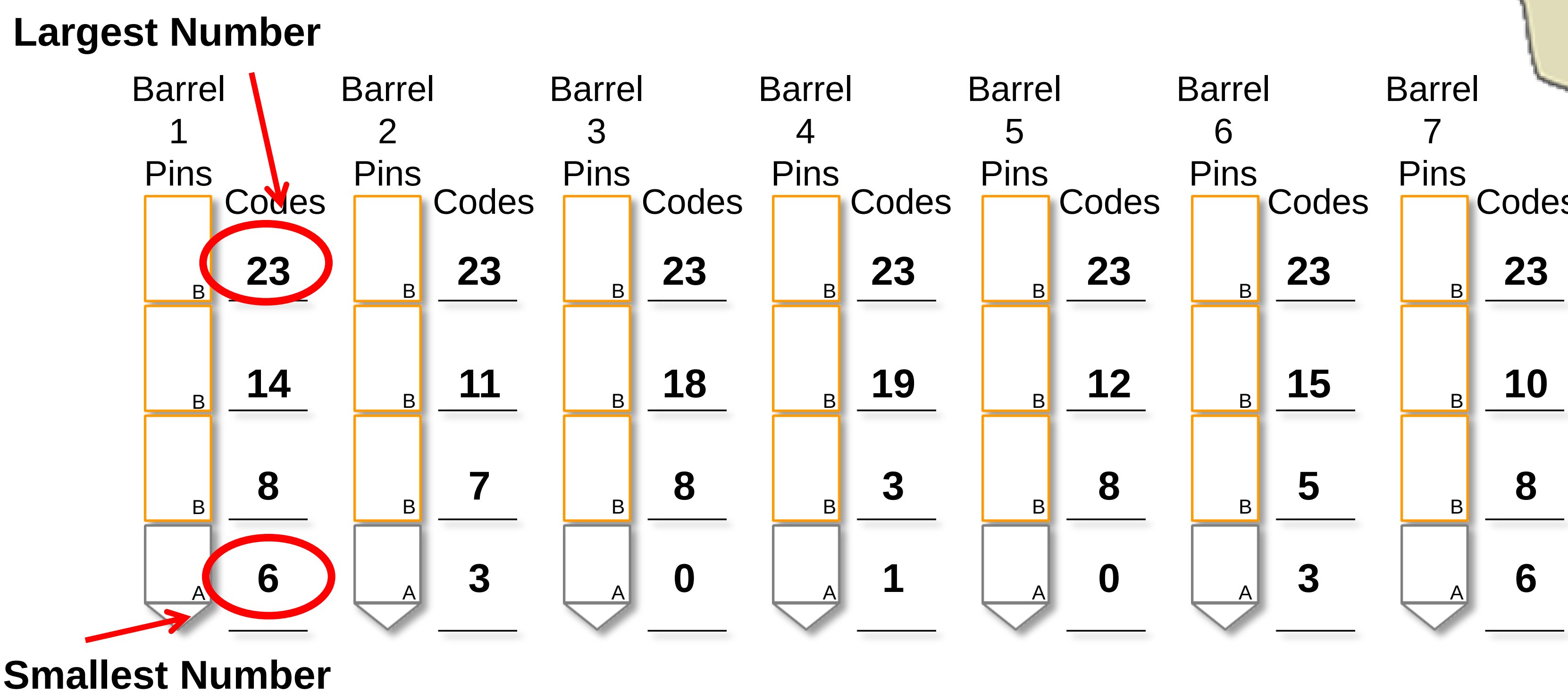
NOTE: It is **NOT** necessary to enter any master-level keys other than the GM. They will automatically work.

BA1 Example

The codes from each barrel are entered into the chart below, in ascending order *(Smallest Number at the bottom, largest Number at the top).*

Barrel #	1	2	3	4	5	6	7
TOTAL STACK	23	23	23	23	23	23	23
CONTROL	14	11	18	19	12	15	10
GRAND MASTER	8	3	0	1	8	3	6
~~MASTER~~							
~~SUB MASTER~~							
IND. OPERATING	6	7	8	3	0	5	8





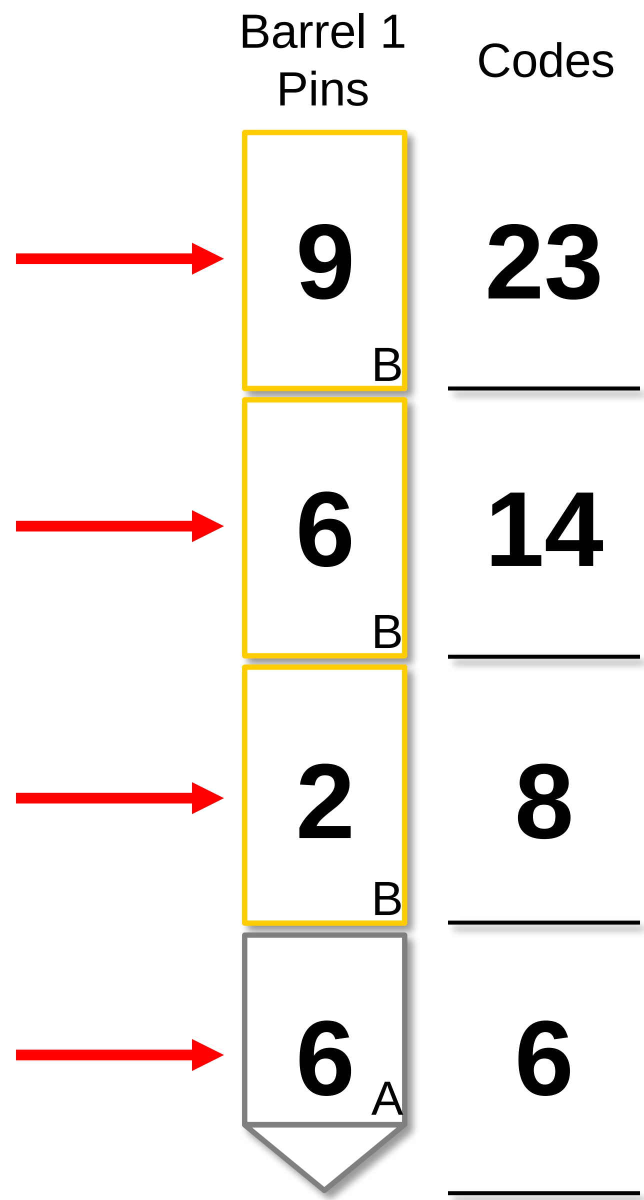
Barrel 1

4th - To find the 3rd “B” pin segment, subtract the 2nd “B” code from the 3rd “B” code and enter the difference into the chart.

3rd - To find the 2nd “B” pin segment, subtract the 1st “B” code from the 2nd “B” code and enter difference into the chart.

2nd - To find the find 1st “B” pin segment subtract the “A” code (6) from the 1st “B” code (8). The difference is 2 and it is entered into the chart as a 2 pin segment.

1st - The smallest code number is always the “A” pin segment. It goes in the “A” box in the Pin Segments column.



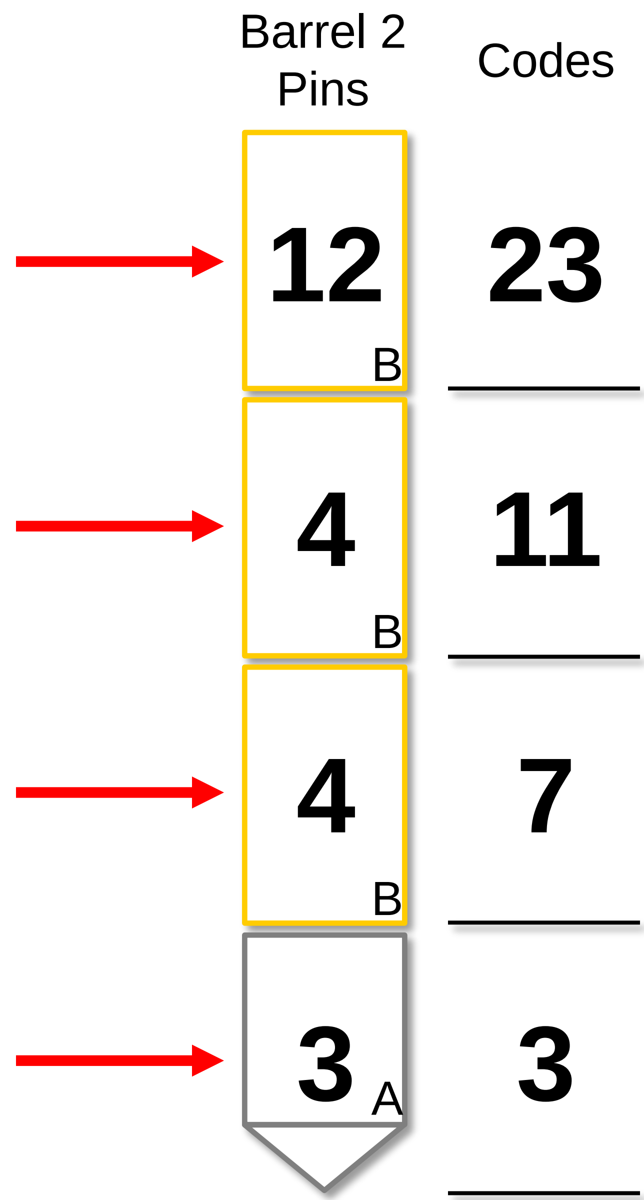
Barrel 2

4th - To find the 3rd "B" pin segment, subtract the 2nd "B" code from the 3rd "B" code and enter the difference into the chart.

3rd - To find the 2nd "B" pin segment, subtract the 1st "B" code from the 2nd "B" code and enter difference into the chart.

2nd - To find the find 1st "B" pin segment subtract the "A" code (3) from the 1st "B" code (7). The difference is 4 and it is entered into the chart as a 4 pin segment.

1st - The smallest code number is always the "A" pin segment. It goes in the "A" box in the Pin Segments column.



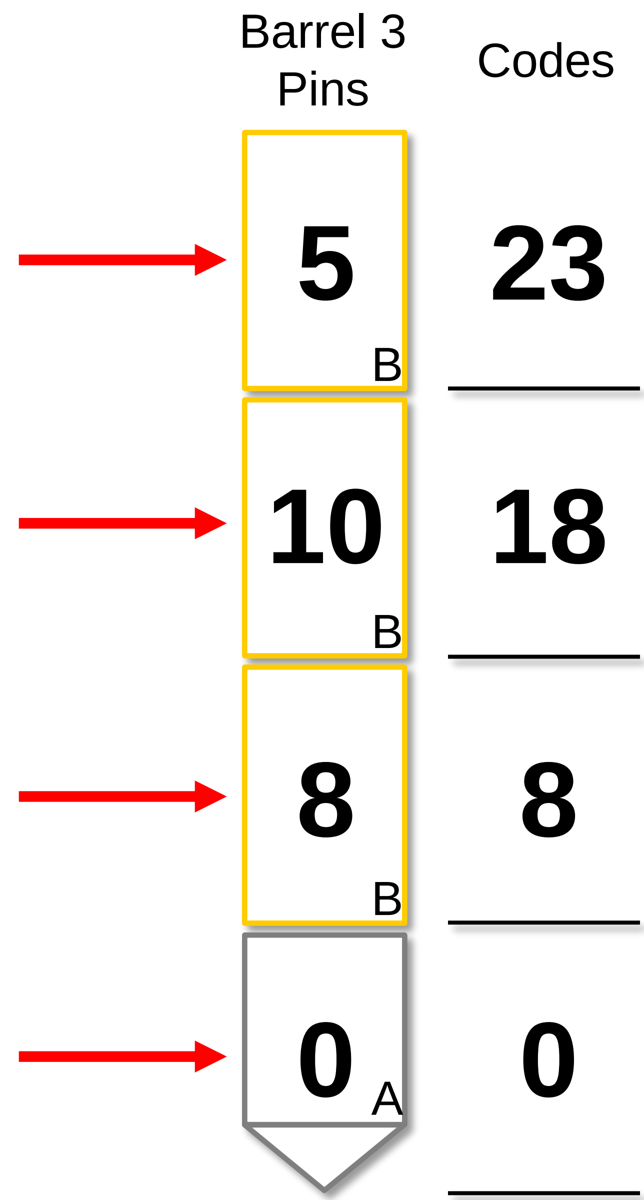
Barrel 3

4th - To find the 3rd “B” pin segment, subtract the 2nd “B” code from the 3rd “B” code and enter the difference into the chart.

3rd - To find the 2nd “B” pin segment, subtract the 1st “B” code from the 2nd “B” code and enter difference into the chart.

2nd - To find the find 1st “B” pin segment subtract the “A” code (0) from the 1st “B” code (8). The difference is 8 and it is entered into the chart as a 8 pin segment.

1st - The smallest code number is always the “A” pin segment. It goes in the “A” box in the Pin Segments column.



The smallest code number is always the “A” pin segment. It goes in the “A” box in the Pin Segments column.

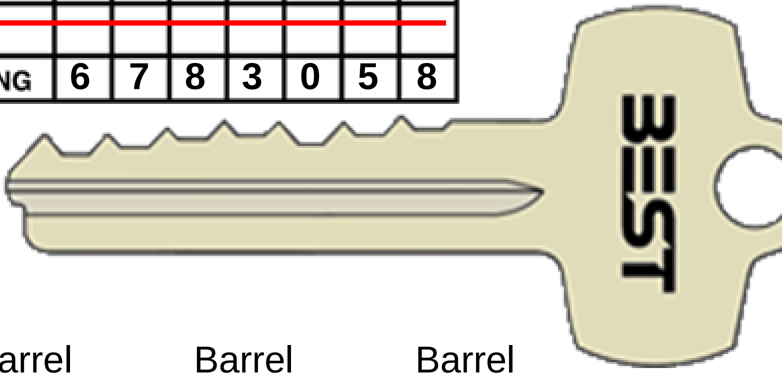
To find the find 1st “B” **pin segment** subtract the “A” code from the 1st “B” code. The difference is entered into the chart as a pin segment.

To find the 2nd “B” pin segment, subtract the 1st “B” code from the 2nd “B” code and enter difference into the chart.

To find the 3rd “B” pin segment, subtract the 2nd “B” code from the 3rd “B” code and enter difference into the chart.

BA1 Example

Barrel #	1	2	3	4	5	6	7
TOTAL STACK	23	23	23	23	23	23	23
CONTROL	14	11	18	19	12	15	10
GRAND MASTER	8	3	0	1	8	3	6
~~MASTER~~							
~~SUB MASTER~~							
IND. OPERATING	6	7	8	3	0	5	8



Barrel 1 Pins	Codes	Barrel 2 Pins	Codes	Barrel 3 Pins	Codes	Barrel 4 Pins	Codes	Barrel 5 Pins	Codes	Barrel 6 Pins	Codes	Barrel 7 Pins	Codes
9 B	23	12 B	23	5 B	23	4 B	23	11 B	23	8 B	23	13 B	23
6 B	14	4 B	11	10 B	18	16 B	19	4 B	12	10 B	15	2 B	10
2 B	8	4 B	7	8 B	8	2 B	3	8 B	8	2 B	5	2 B	8
6 A	6	3 A	3	0 A	0	1 A	1	0 A	0	3 A	3	6 A	6

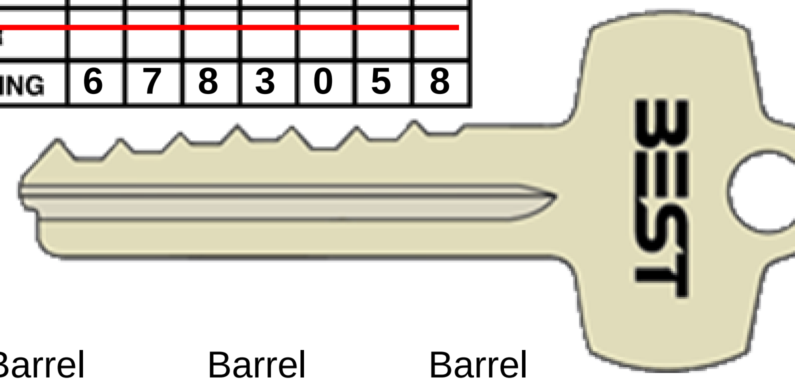
BA1 Example

Put lines through the code columns so that you do not confuse them with the pin segment columns.

Starting with the "A" pin segment and ending with the top "B" pin segment, load all pin segments into each barrel.

Start with barrel 1 and finish with barrel 7 (barrel six in a 6-pin system).

Barrel #	1	2	3	4	5	6	7
TOTAL STACK	23	23	23	23	23	23	23
CONTROL	14	11	18	19	12	15	10
GRAND MASTER	8	3	0	1	8	3	6
~~MASTER~~							
~~SUB MASTER~~							
IND. OPERATING	6	7	8	3	0	5	8

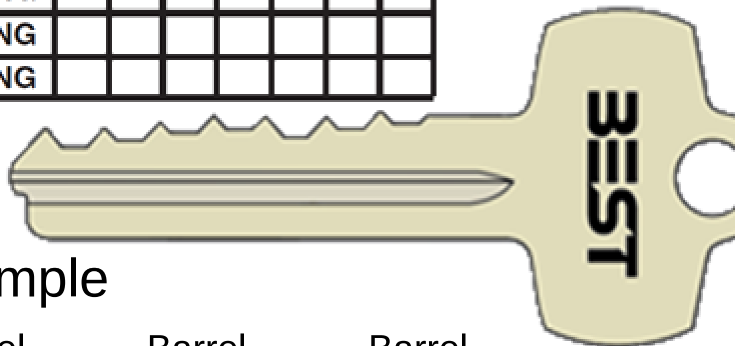


Barrel 1 Pins	Codes	Barrel 2 Pins	Codes	Barrel 3 Pins	Codes	Barrel 4 Pins	Codes	Barrel 5 Pins	Codes	Barrel 6 Pins	Codes	Barrel 7 Pins	Codes
9 B	23	12 B	23	5 B	23	4 B	23	11 B	23	8 B	23	13 B	23
6 B	14	4 B	11	10 B	18	16 B	19	4 B	12	10 B	15	2 B	10
2 B	8	4 B	7	8 B	8	2 B	3	8 B	8	2 B	5	2 B	8
6 A	6	3 A	3	0 A	0	1 A	1	0 A	0	3 A	3	6 A	6

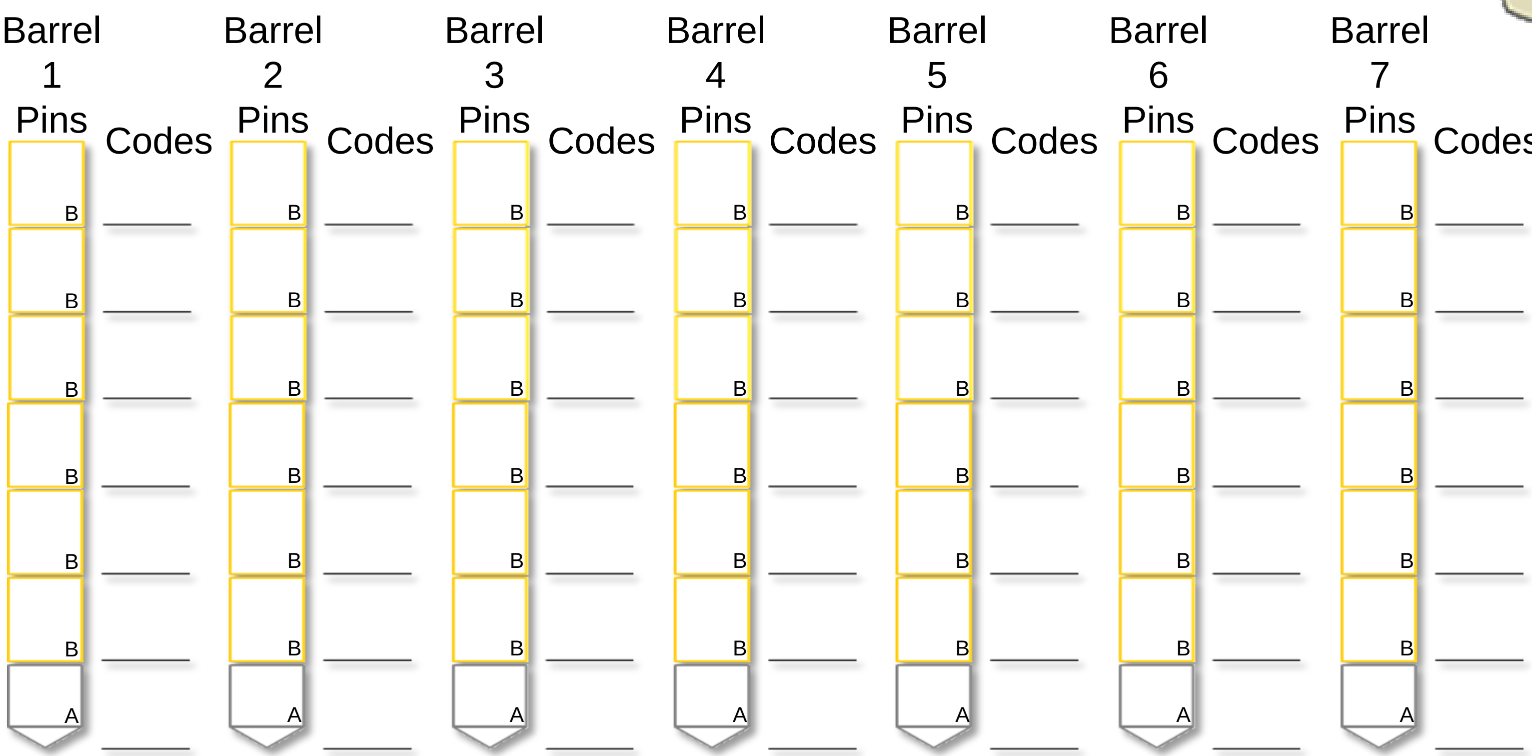
Selective Keying (or cross-keying) is the deliberate process of combinating a core in a masterkey system to two or more different keys, which would not normally be expected to operate together.

The process of calculating the pin segments for selective keying is basically the same as standard keying except the that the pin segment stacks will have more segments.

Barrel #	1	2	3	4	5	6	7	
TOTAL STACK	23	23	23	23	23	23	23	
CONTROL	14	11	18	19	12	15	10	
GRAND MASTER	8	3	0	1	8	3	6	
~~MASTER~~								
~~SUB MASTER~~								
IND. OPERATING	6	7	8	3	0	5	8	BA1
IND. OPERATING								
IND. OPERATING								
IND. OPERATING								



BA4X Example

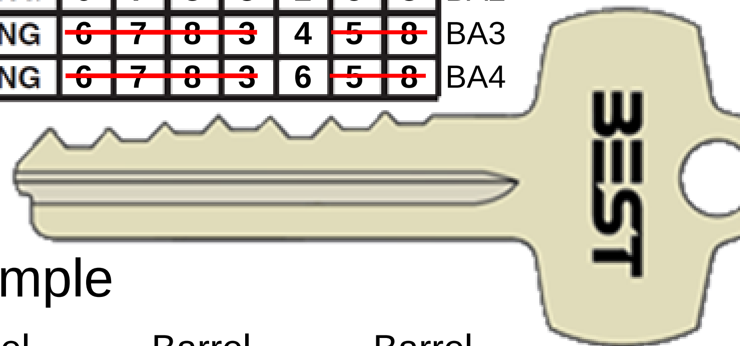


In the sample chart at the right we have the same Control, Grandmaster and Individual Operating key that we worked with earlier.

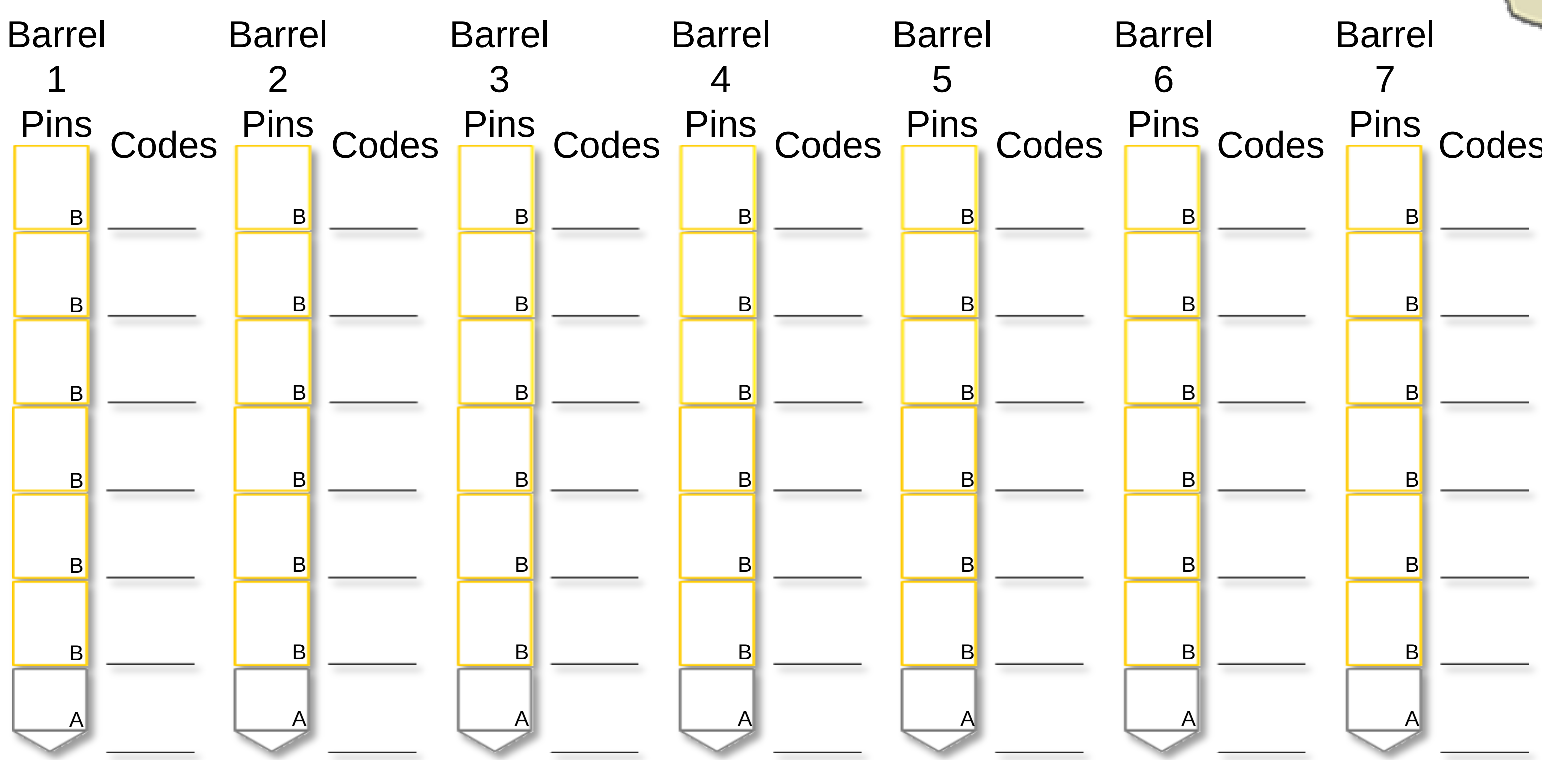
The difference is that we are going to add three additional operating keys into the core.

Adding more keys to a core does not add to the Total Stack height but it does require a larger chart to calculate the pin segment stacks.

Barrel #	1	2	3	4	5	6	7	
TOTAL STACK	23	23	23	23	23	23	23	
CONTROL	14	11	18	19	12	15	10	
GRAND MASTER	8	3	0	1	8	3	6	
~~MASTER~~								
~~SUB MASTER~~								
IND. OPERATING	6	7	8	3	0	5	8	BA1
IND. OPERATING	~~6~~	~~7~~	~~8~~	~~3~~	2	~~5~~	~~8~~	BA2
IND. OPERATING	~~6~~	~~7~~	~~8~~	~~3~~	4	~~5~~	~~8~~	BA3
IND. OPERATING	~~6~~	~~7~~	~~8~~	~~3~~	6	~~5~~	~~8~~	BA4



BA4X Example



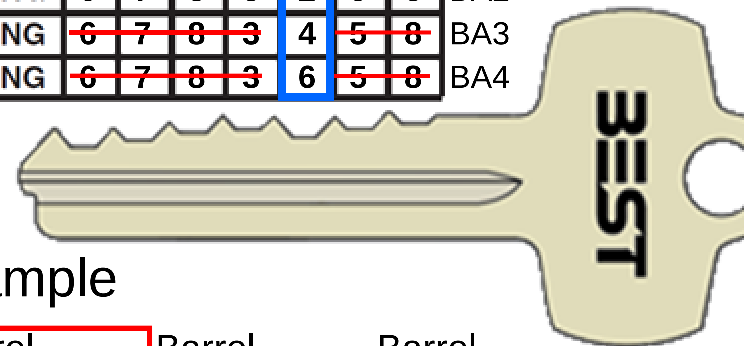
The smallest code number is always the “A” pin segment. It goes in the “A” box in the Pin Segments column.

To find the find 1st “B” **pin segment** subtract the “A” code from the 1st “B” code. The difference is entered into the chart as a pin segment.

To find the 2nd “B” pin segment, subtract the 1st “B” code from the 2nd “B” code and enter difference into the chart.

To find the 3rd, 4th, 5th & 6th “B” pin segments, repeat the previous pattern.

Barrel #	1	2	3	4	5	6	7	
TOTAL STACK	23	23	23	23	23	23	23	
CONTROL	14	11	18	19	12	15	10	
GRAND MASTER	8	3	0	1	8	3	6	
~~MASTER~~								
~~SUB MASTER~~								
IND. OPERATING	6	7	8	3	0	5	8	BA1
IND. OPERATING	~~6~~	~~7~~	~~8~~	~~3~~	2	~~5~~	~~8~~	BA2
IND. OPERATING	~~6~~	~~7~~	~~8~~	~~3~~	4	~~5~~	~~8~~	BA3
IND. OPERATING	~~6~~	~~7~~	~~8~~	~~3~~	6	~~5~~	~~8~~	BA4



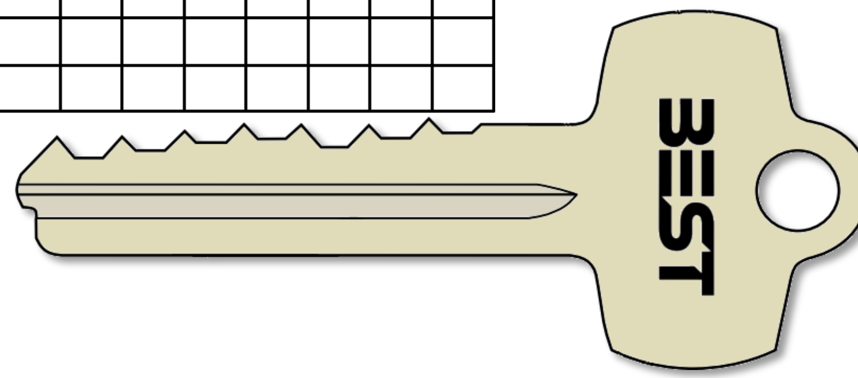
BA4X Example

Segment	Barrel 1 Pins	Codes	Barrel 2 Pins	Codes	Barrel 3 Pins	Codes	Barrel 4 Pins	Codes	Barrel 5 Pins	Codes	Barrel 6 Pins	Codes	Barrel 7 Pins	Codes
B									11	23				
B									4	12				
B									2	8				
B	9	23	12	23	5	23	4	23	2	6	8	23	13	23
B	6	14	4	11	10	18	16	19	2	4	10	15	2	10
B	2	8	4	7	8	8	2	3	2	2	2	5	2	8
A	6	6	3	3	0	0	1	1	0	0	3	3	6	6

A2 Key System

Coremark ______

Barrel #	1	2	3	4	5	6	7
Total Stack	23	23	23	23	23	23	23
Control (+ 10)							
GM							
Master							
Sub-master							
Operating							
Operating							
Operating							
Operating							



Barrel 1
Pins | Codes
B ______
B ______
B ______
A ______

Barrel 2
Pins | Codes
B ______
B ______
B ______
A ______

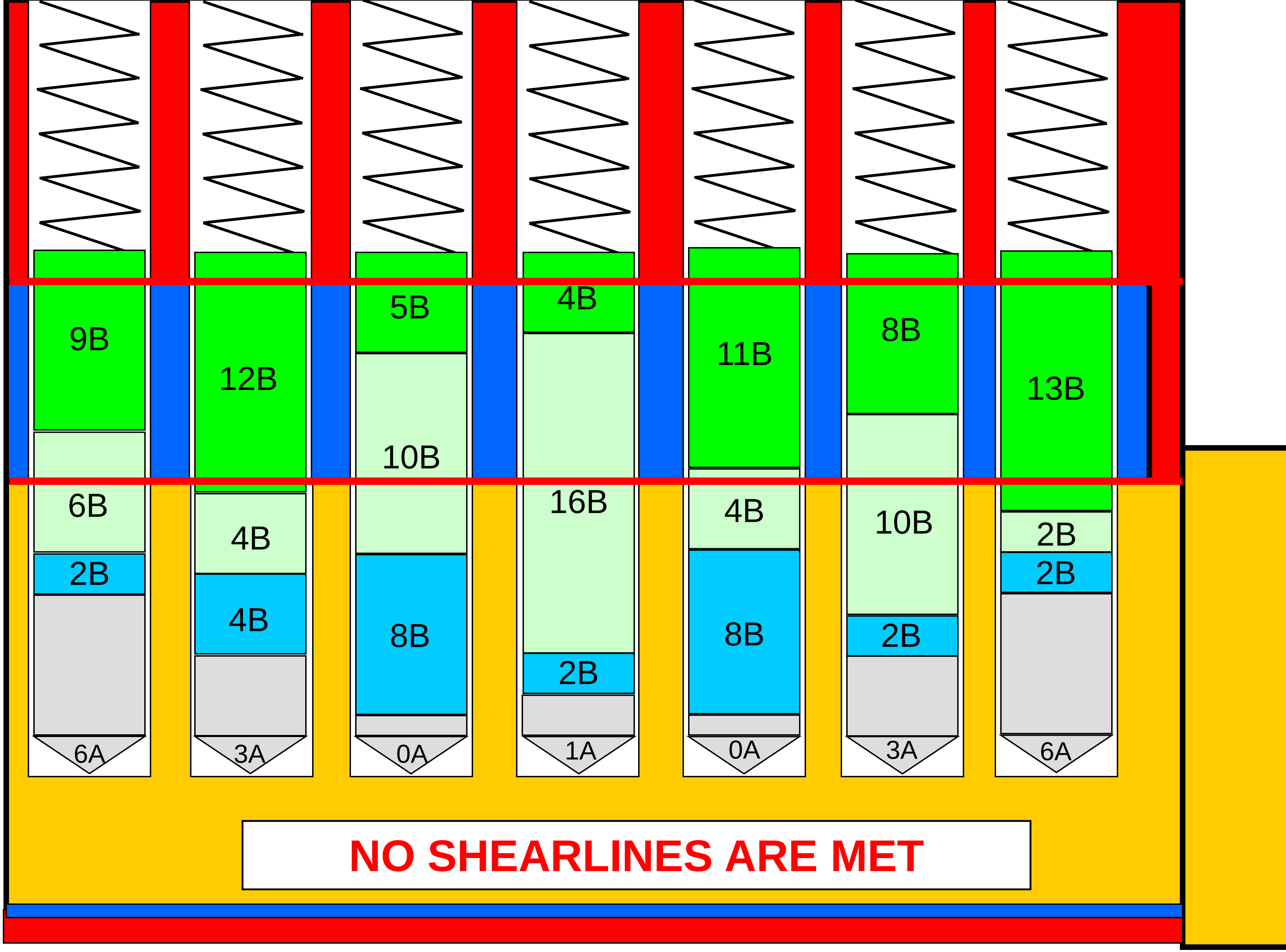
Barrel 3
Pins | Codes
B ______
B ______
B ______
A ______

Barrel 4
Pins | Codes
B ______
B ______
B ______
A ______

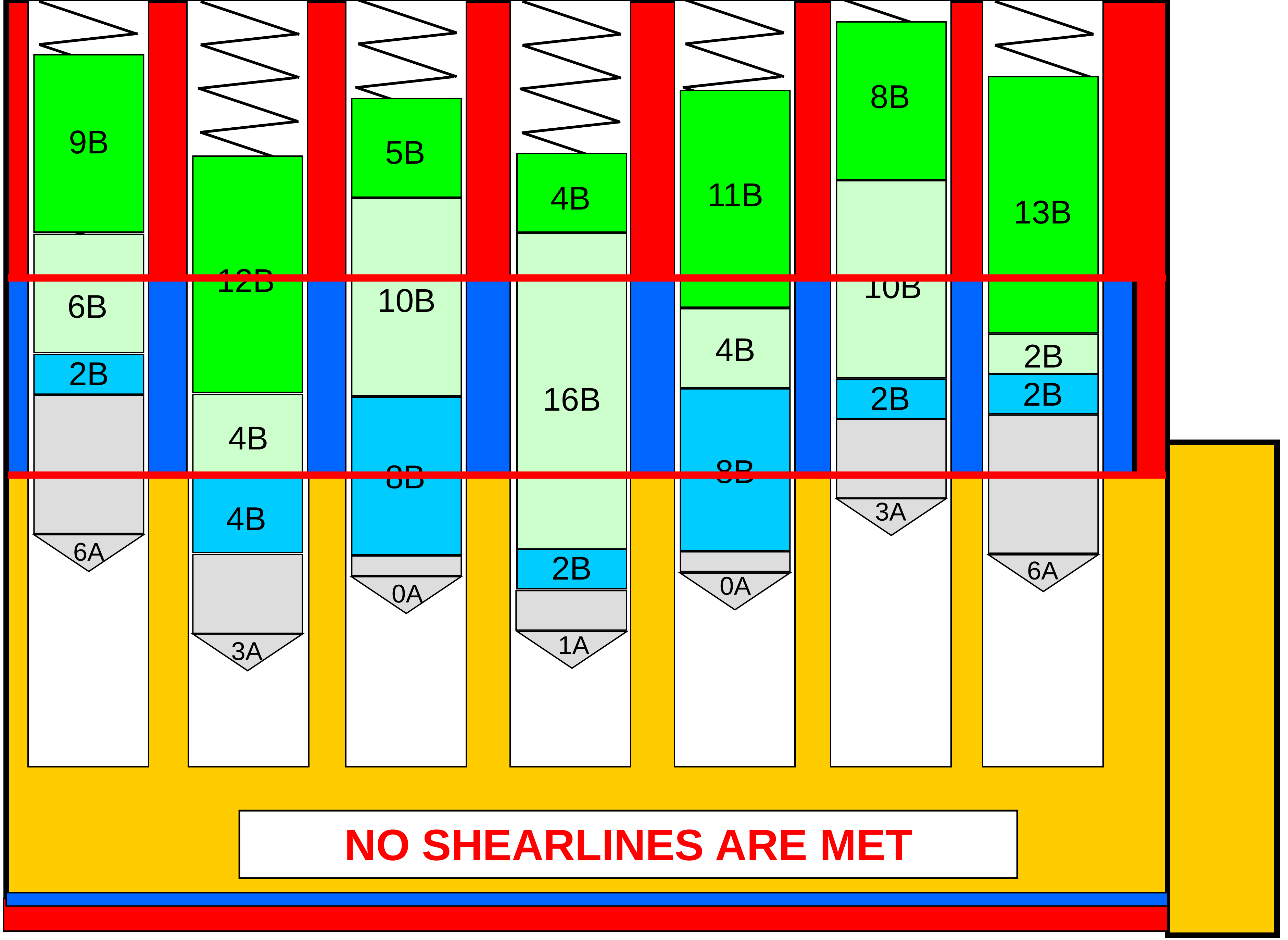
Barrel 5
Pins | Codes
B ______
B ______
B ______
A ______

Barrel 6
Pins | Codes
B ______
B ______
B ______
A ______

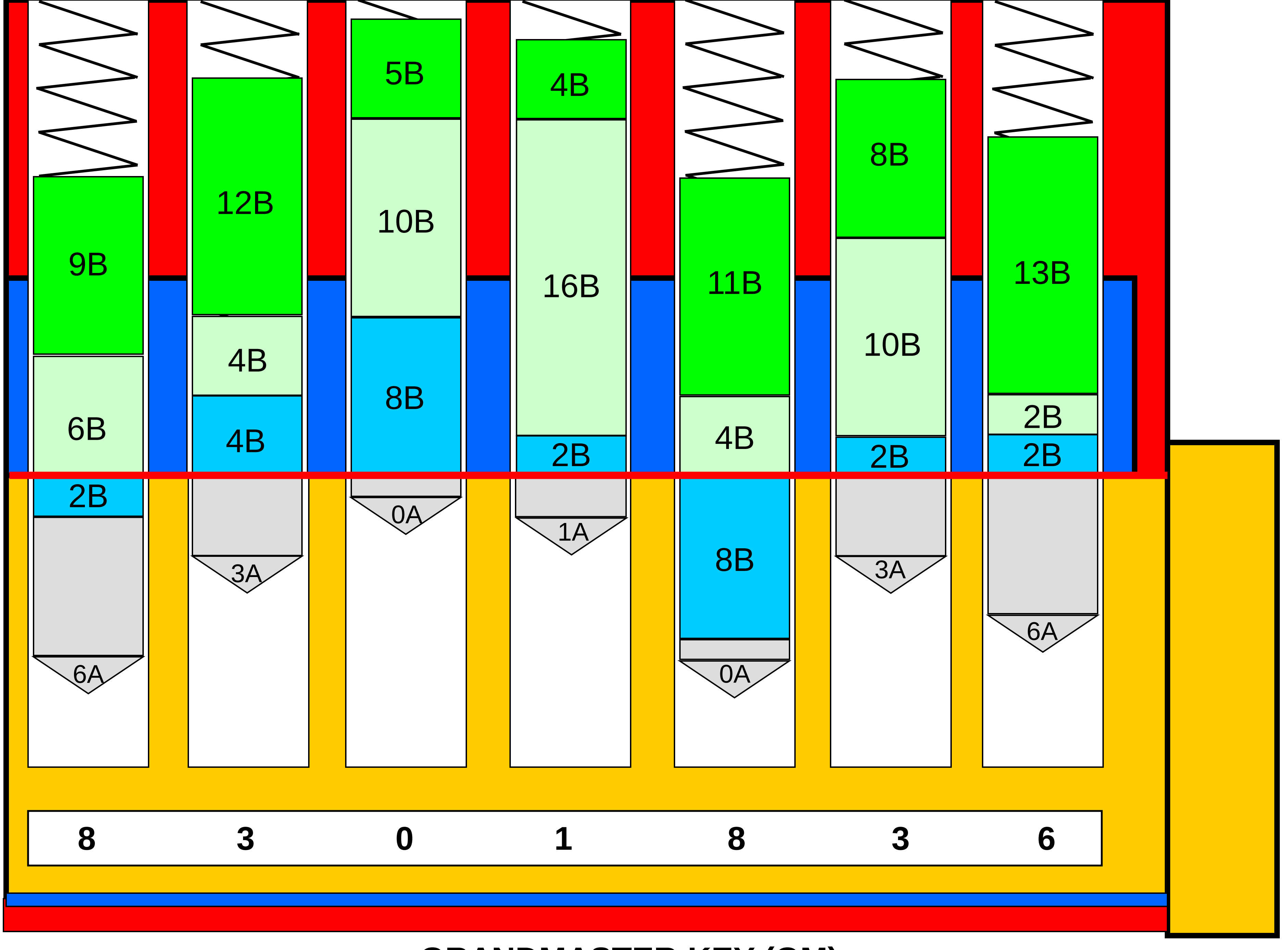
Barrel 7
Pins | Codes
B ______
B ______
B ______
A ______



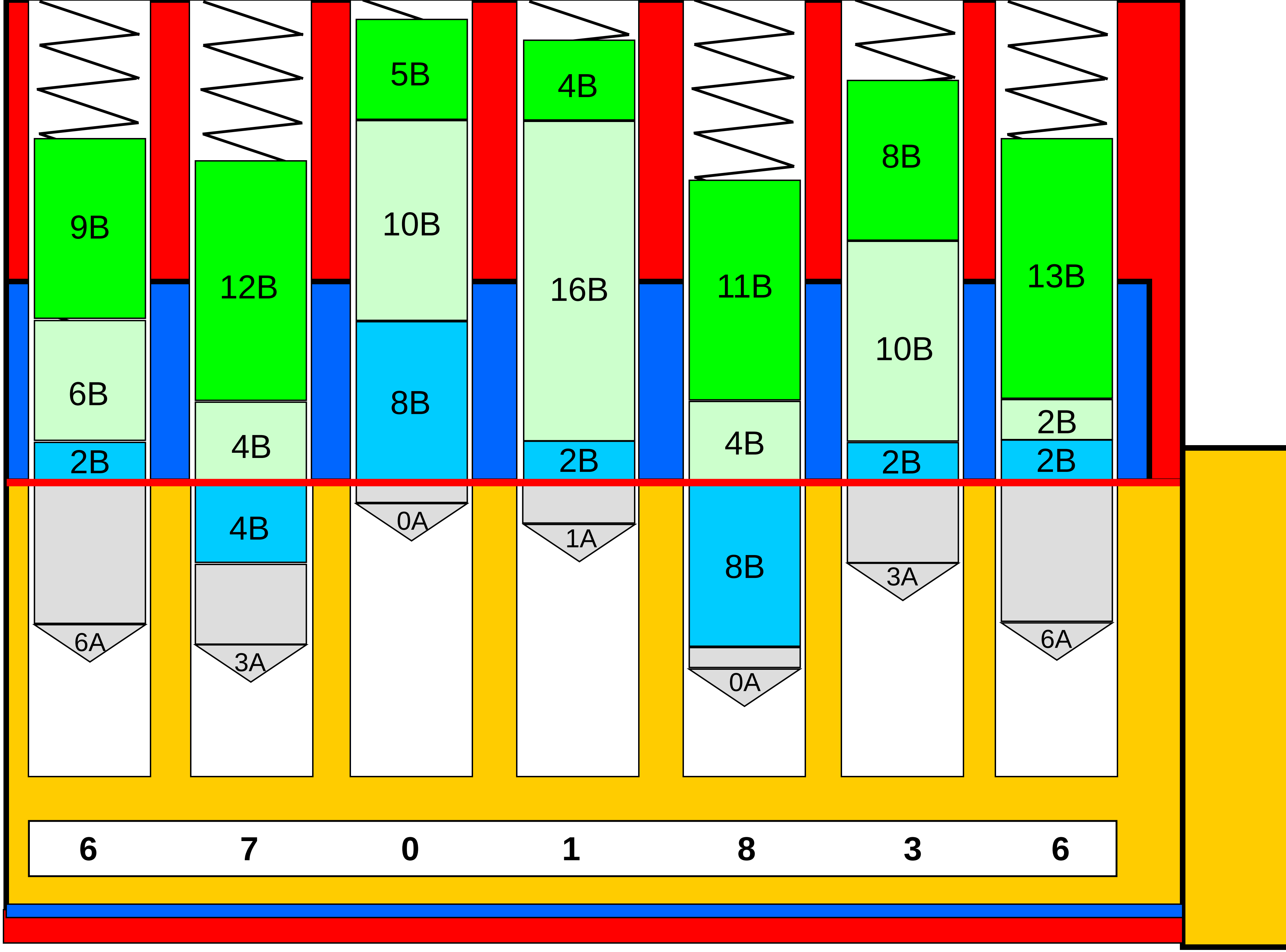
NO KEY INSERTED



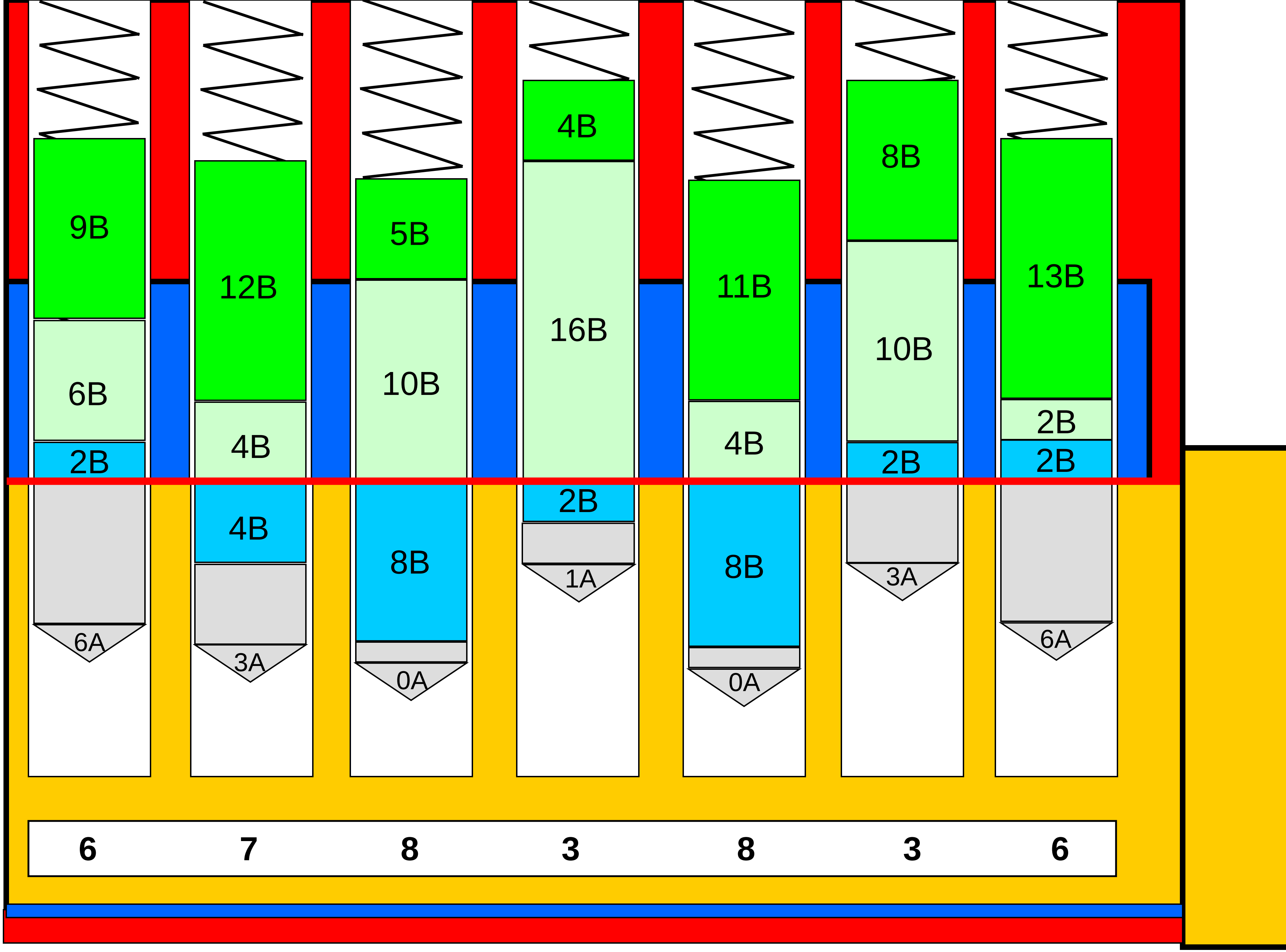
INCORRECT KEY



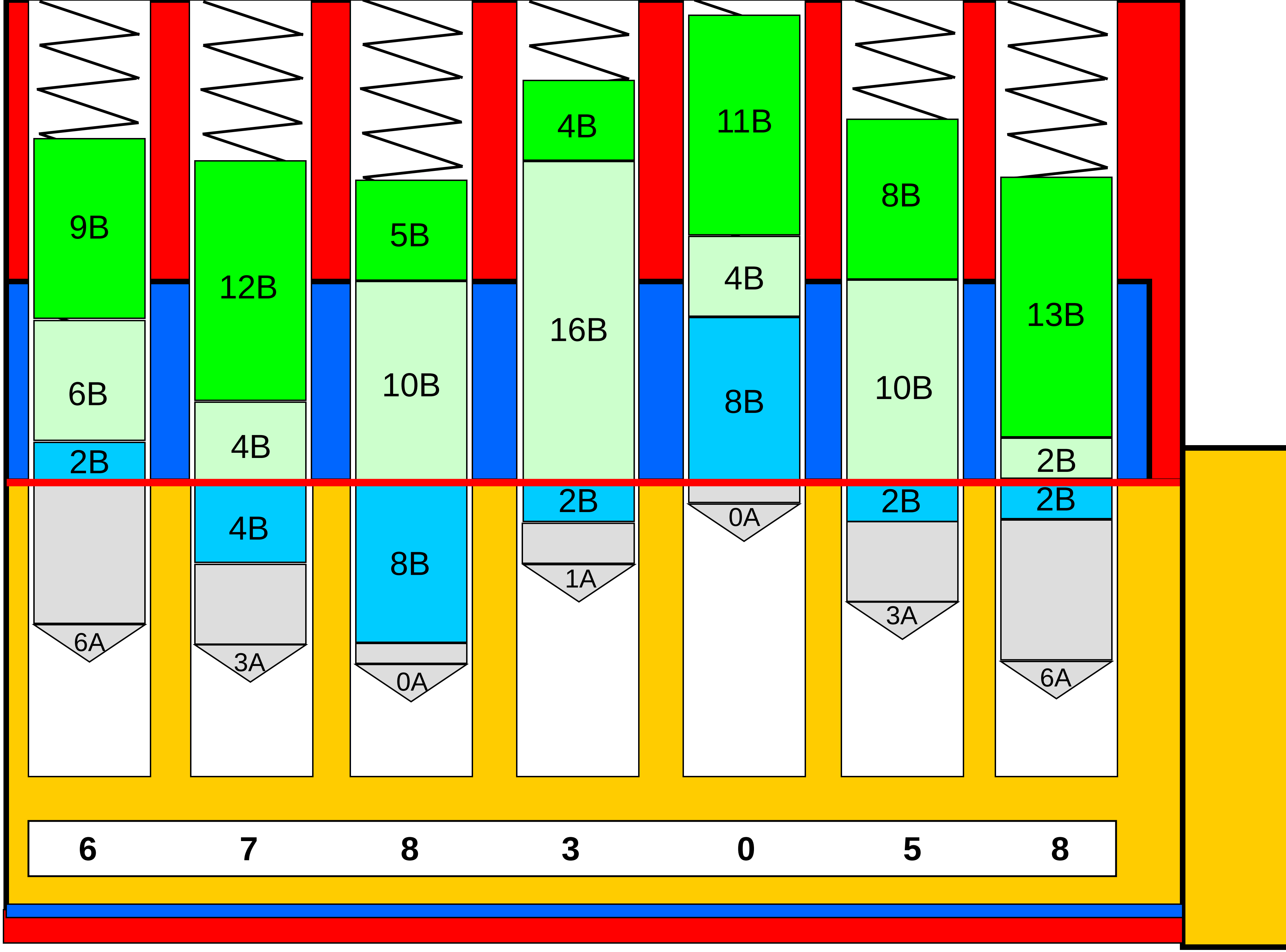
GRANDMASTER KEY (GM)


9B
6B
2B
6A
12B
4B
4B
3A
5B
10B
8B
0A
4B
16B
2B
1A
11B
4B
8B
0A
8B
10B
2B
3A
13B
2B
2B
6A
6
7
0
1
8
3
6

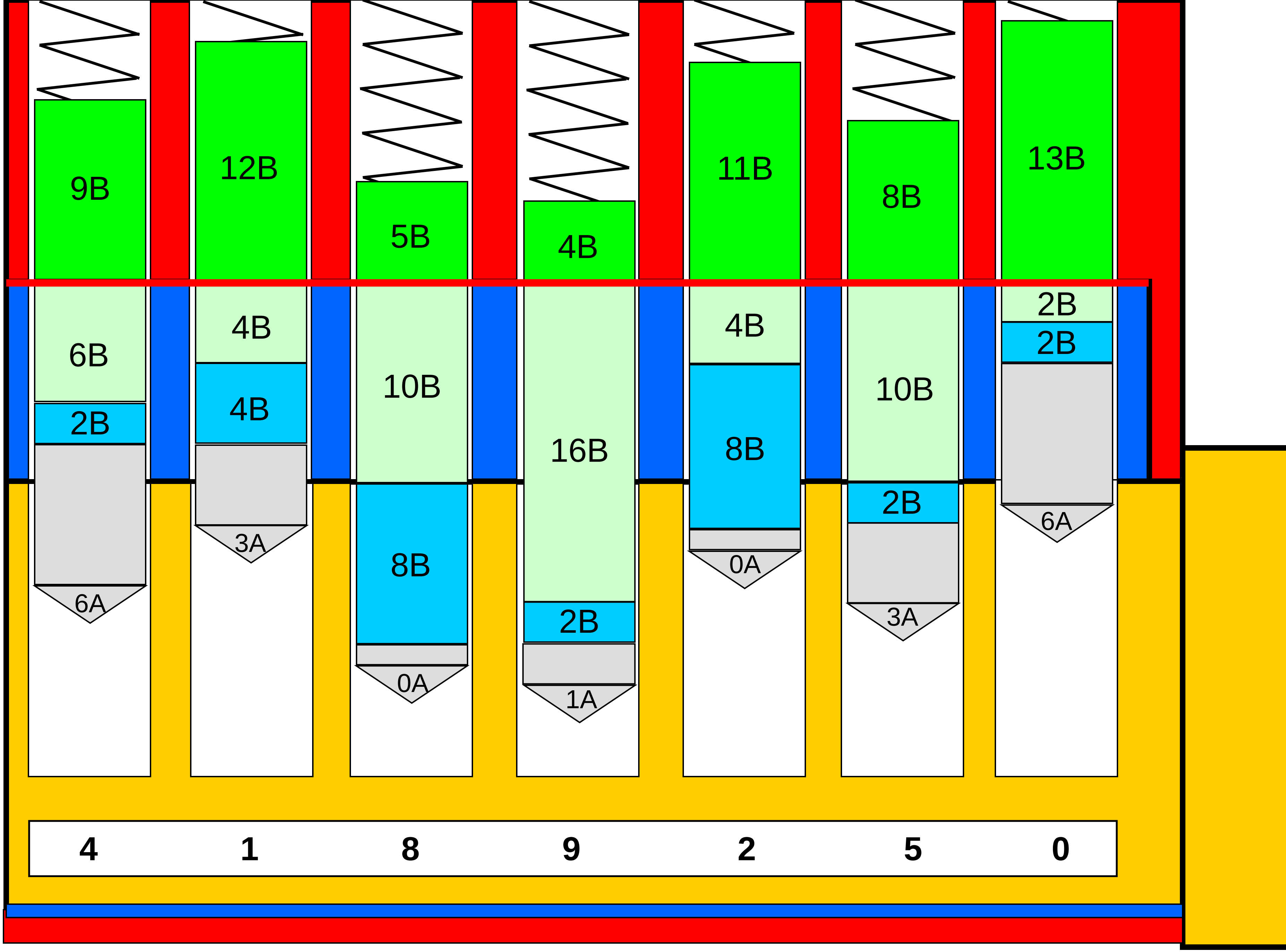
MASTER KEY (B)



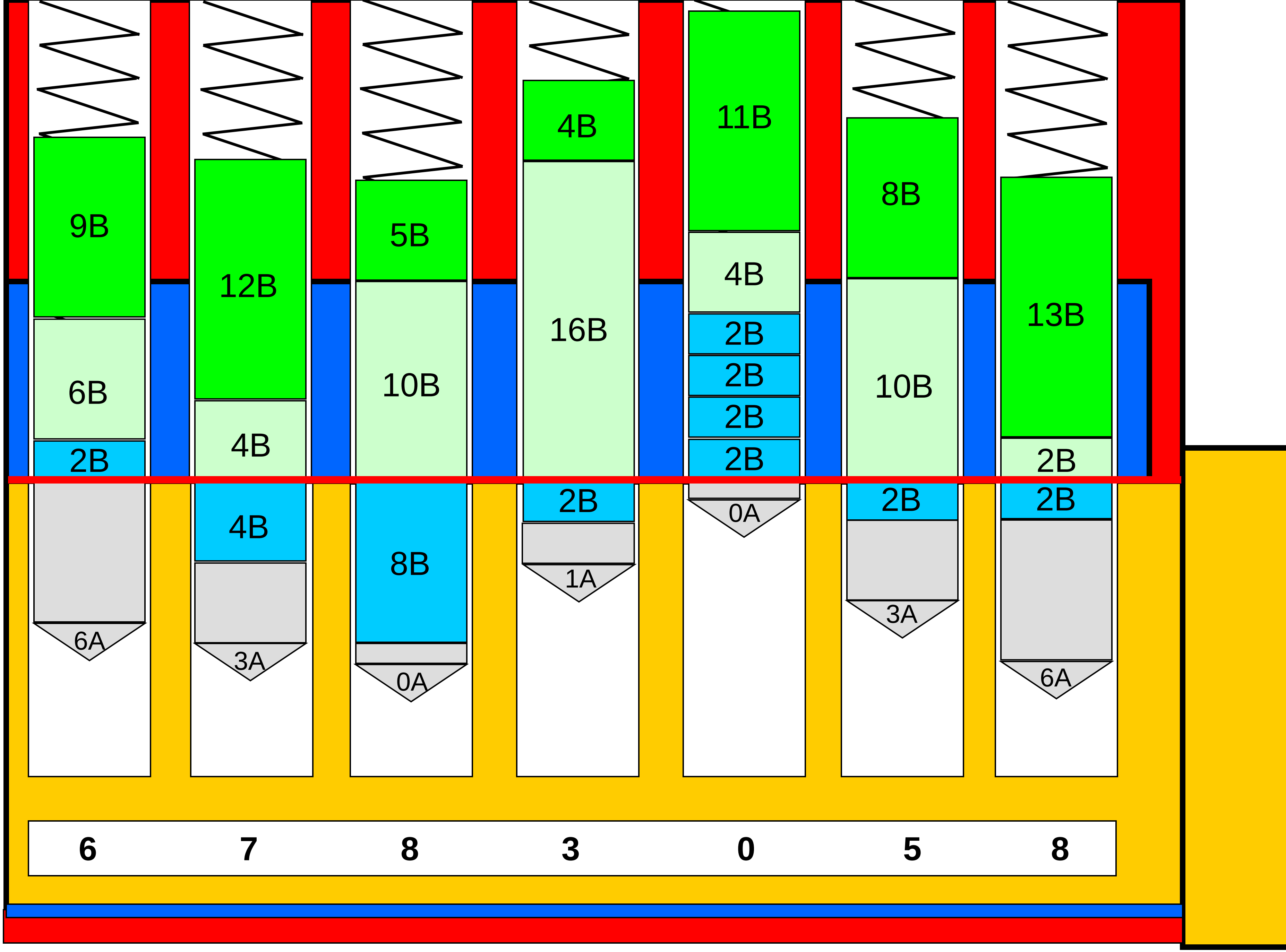
SUB-MASTER KEY (BA)



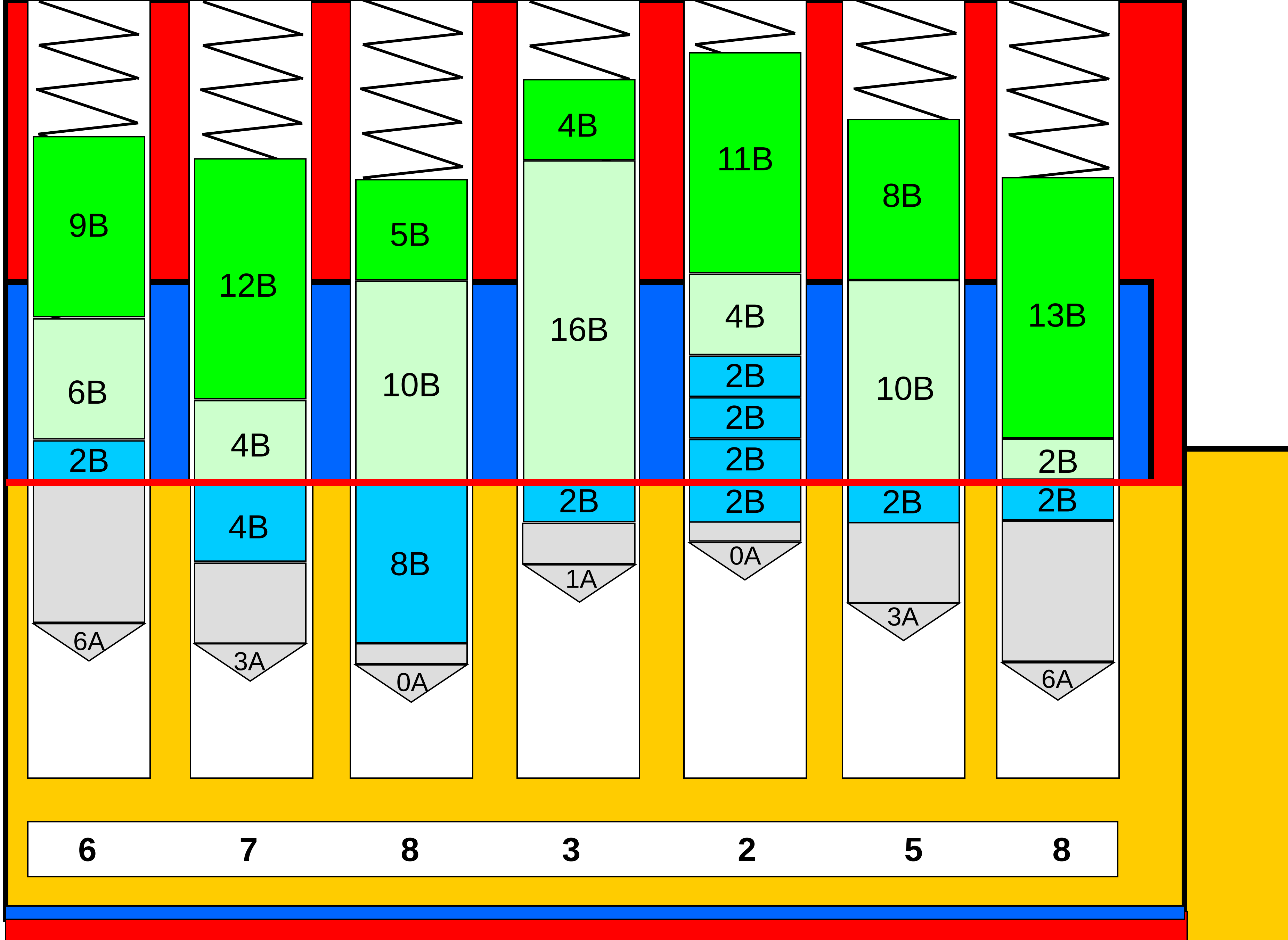
INDIVIDUAL OPERATING KEY (BA1)



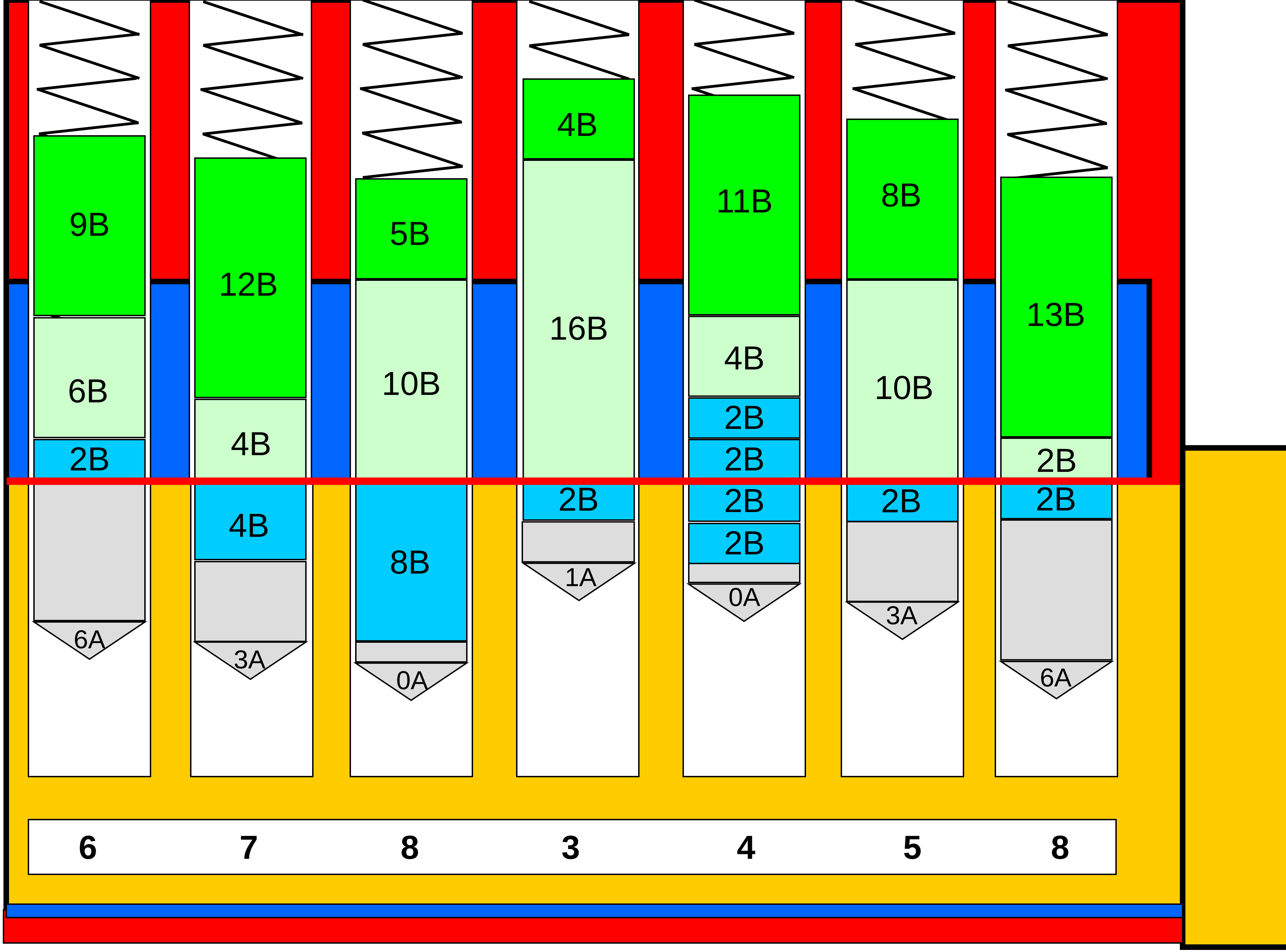
CONTROL KEY (CT)



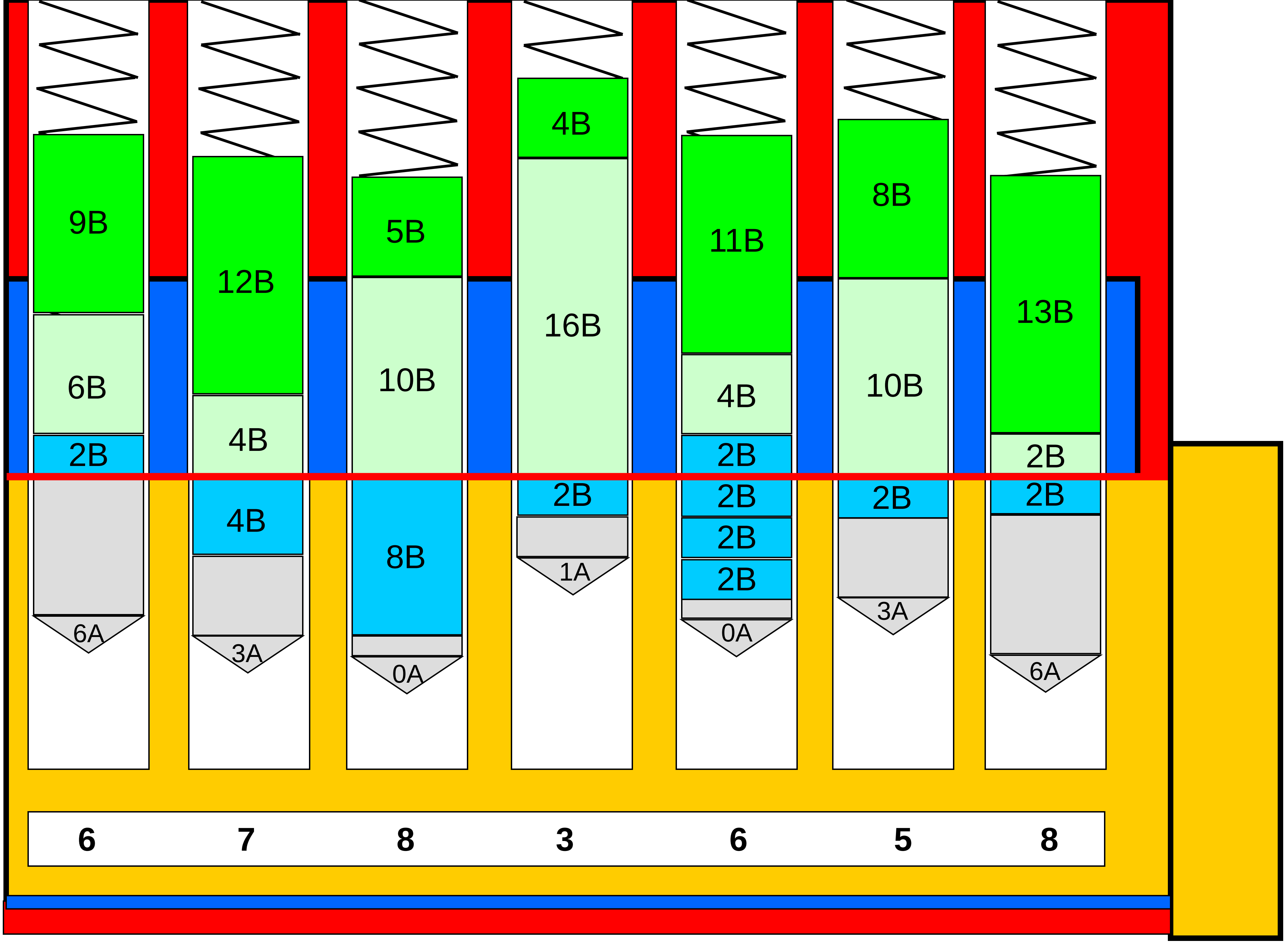
SELECTIVE KEYING: CORE BA4X (With KEY BA1 Inserted)



SELECTIVE KEYING: CORE BA4X (With KEY BA2 Inserted)



SELECTIVE KEYING: CORE BA4X (With KEY BA3 Inserted)



SELECTIVE KEYING: CORE BA4X (With KEY BA4 Inserted)

EJECTING PINS

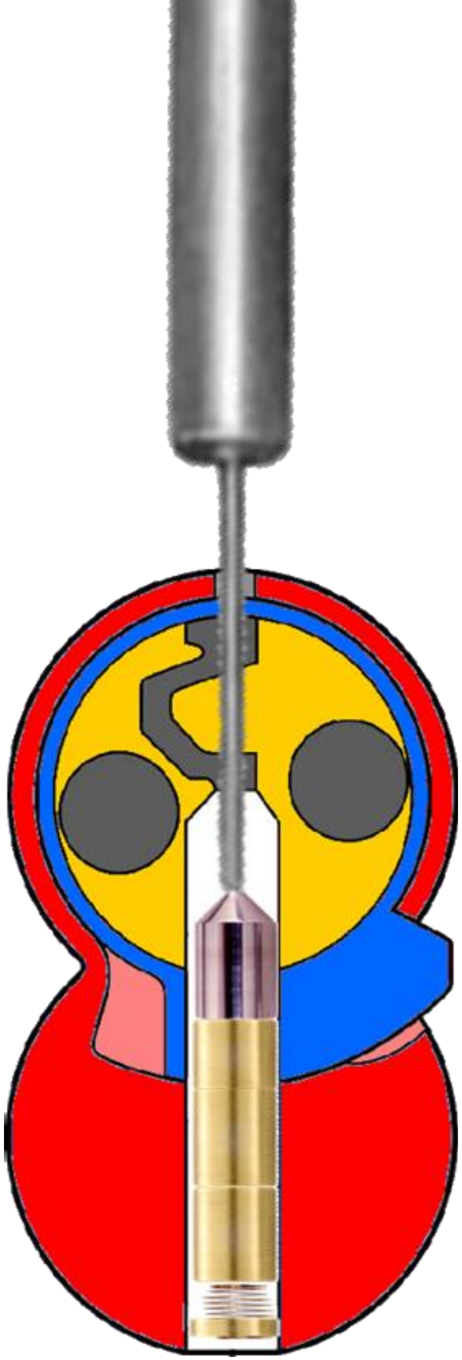
If a used core is going to be rekeyed and still has pins in it, you will need to eject the existing pins.

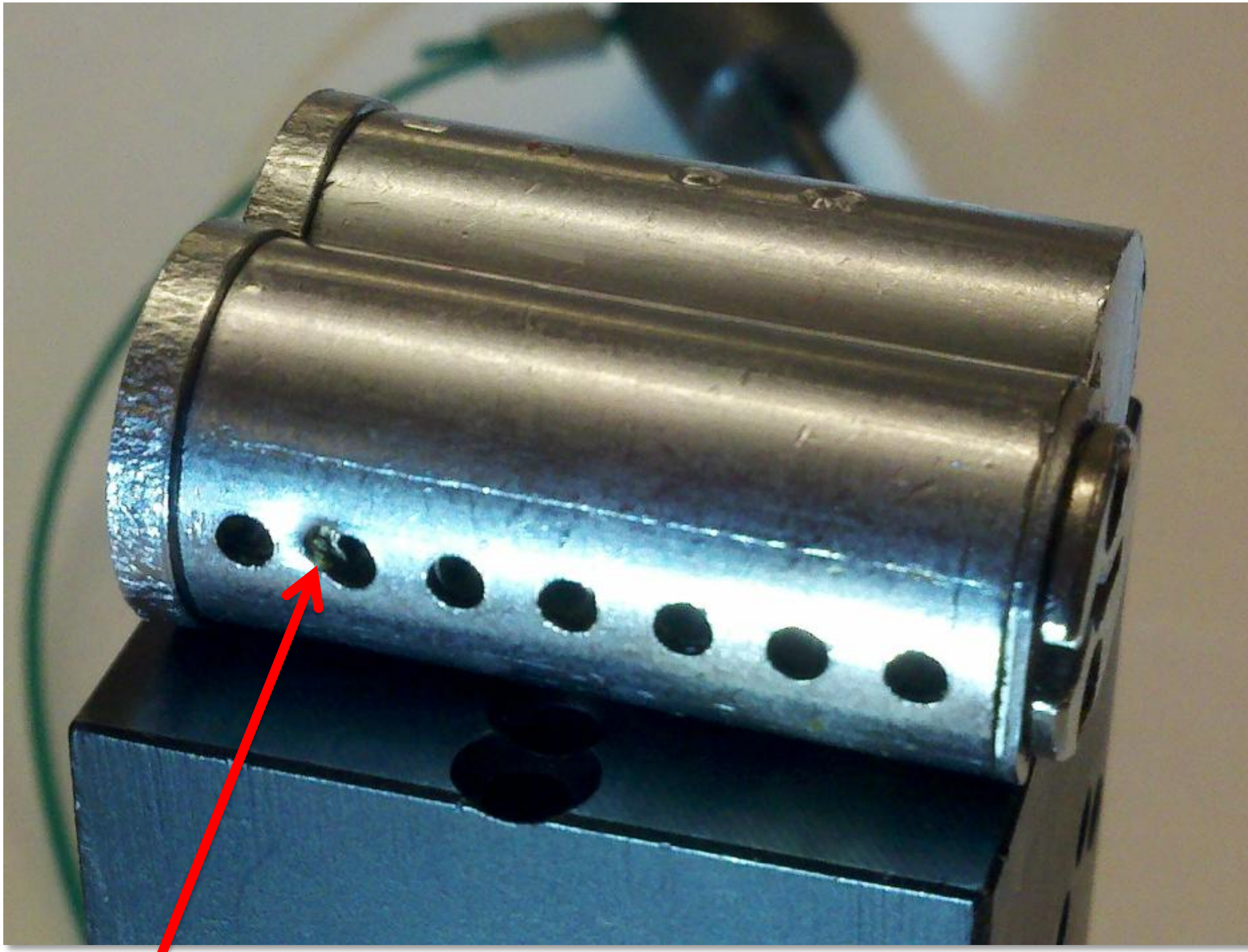


EJECTING PINS

The easiest way to eject pins from a core is to turn the core upside down on a carpet square or pad, insert the Ejector Pin into an Ejector Hole and tap it with a hammer or mallet. The pins will eject onto the carpet.

A **Capping Block** can also be used for de-capping, but, if used incorrectly can cause **damage** to the core.





Damage to Core by incorrect use of Ejector Pin & Capping/De-capping Block

IMPORTANT POINTS TO REMEMBER

- Barrel 1 is at the back of the core
- Barrel 7 is at the face of the core
    - Barrel 6 is at the face for 6-pin cores
- Always start loading pins at barrel 1 and work toward the core face
- Load one barrel completely before moving to the next
- “A” pins are inserted with the point down
- “B” pin segments are the same on both ends and can be inserted either way
- Springs are loaded after all pin segments are loaded into the barrels and after the core is in the capping block
- Test the Control Key and all Operating Keys in every core
- Cores can be lubricated with Dixon Ticonderoga #2 Flaked Graphite, LPS1 spray lubricant or Corrosion Free Formula 8000 spray lubricant
    - DO NOT mix dry & wet lubricants

GRAPHITE GUN



CORROSION FREE
FORMULA 8000



LPS SPRAY LUBRICANT



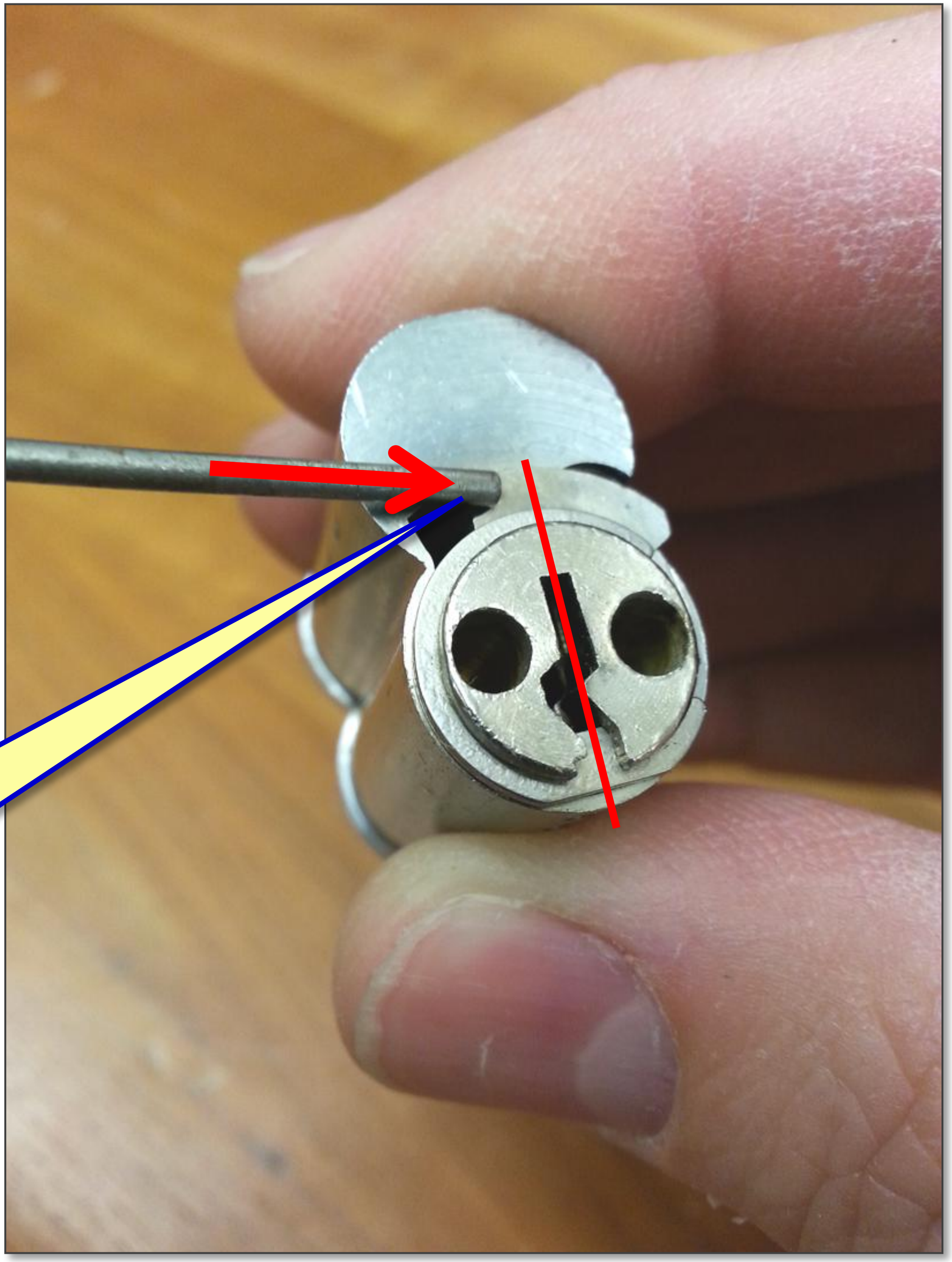
BEST COMBINATING KIT



Please **DO NOT** put used pin segments back into the combinating kits.



Make sure the Keyway is vertical and the Control Lug is extended before dropping pins into the core.

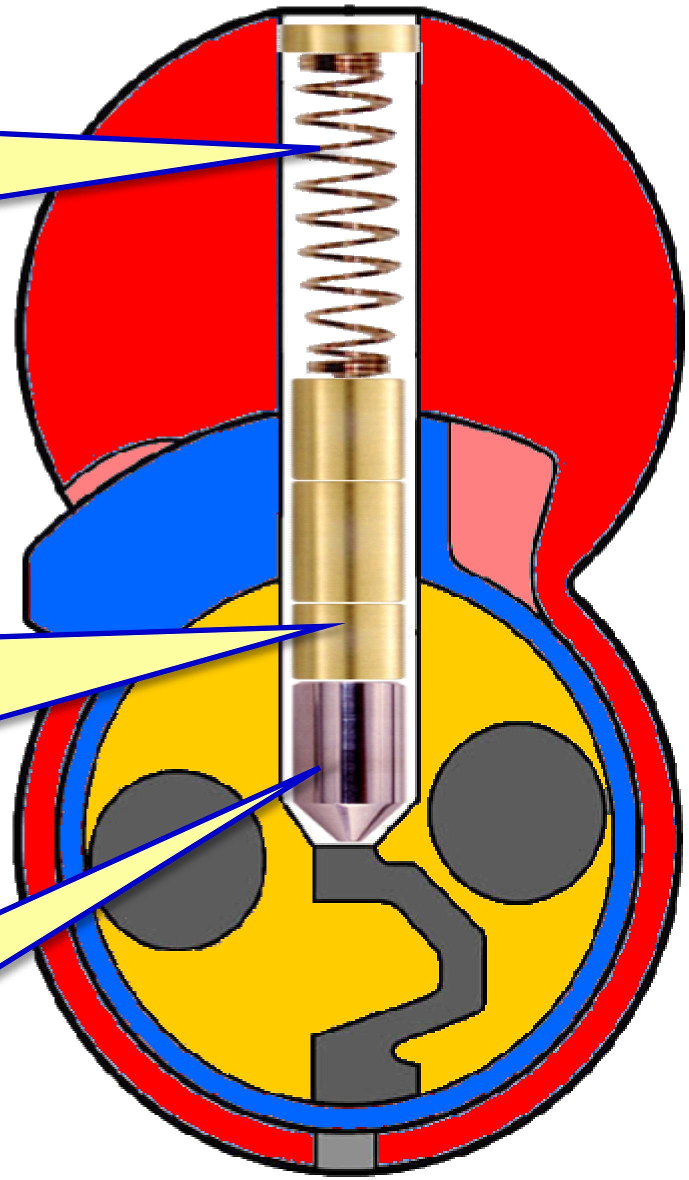


The tip of the Ejector Pin can be used to extend the Control Lug.

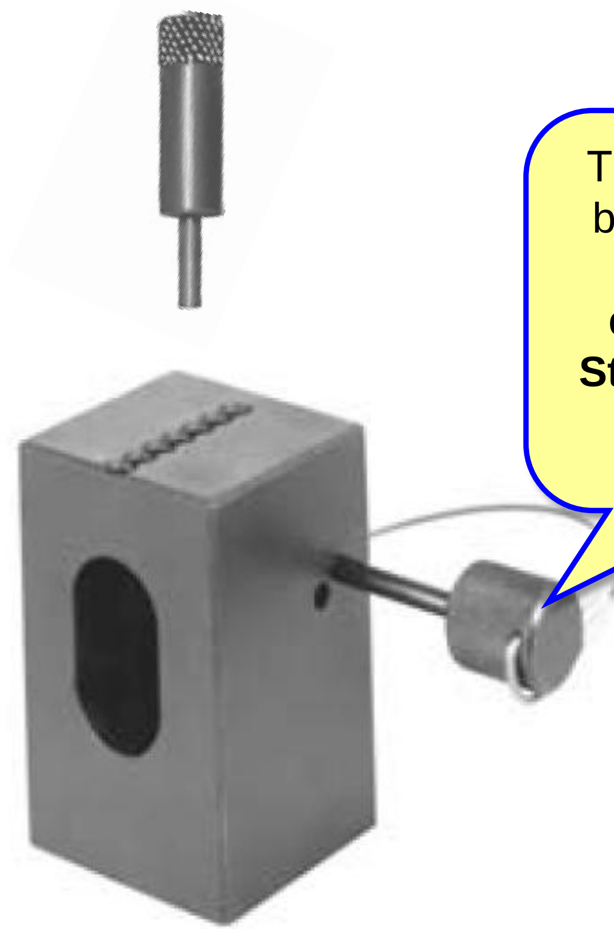
Springs and **Caps** get loaded **AFTER** the core is placed in the **Capping Block** or **Press**

The Top Segments get loaded next, in ascending order from the pinning chart. The Top segments are the same top and bottom.

The Bottom Segments get loaded first with the beveled end pointing down.



HAND CAPPING PIN



The “Tip Stop” must be used to properly align the core for capping. The **Tip Stop <u>MUST NOT</u> be used to seat the caps**.

BEST CORE CAPPING BLOCK

NOTE: The Capping Block is not intended to hold cores for pinning.

The BEST CD517 Capping/De-Capping Press is an optional tool but makes capping quicker, easier and more consistent.



When you are done, please put the tools back into the kit just like you see in this picture. Thanks!



A4 Key System:

Calculating Pin Segments

GUIDELINES FOR A4 SYSTEM SETUP

- The A4 system does **NOT** use the odd / even pattern of the A2 system
- Since the A4 system utilizes a single step progression and there is no odd / even pattern, all A4 system codes should be scrambled for higher security
- The A4 system utilizes code depths 0 through 5
- The A4 system works in powers of 5
- There should not be more than one Control or Grandmaster on the same keyway for the same customer with the A4 system (unless the system is limited or restrictive)

The **Total Stack** in a standard BEST **A4** system is **14** *(The Total Stack is the sum total of all pin segments in a barrel).*

Enter the **Total Stack** in the code chart for all barrels.

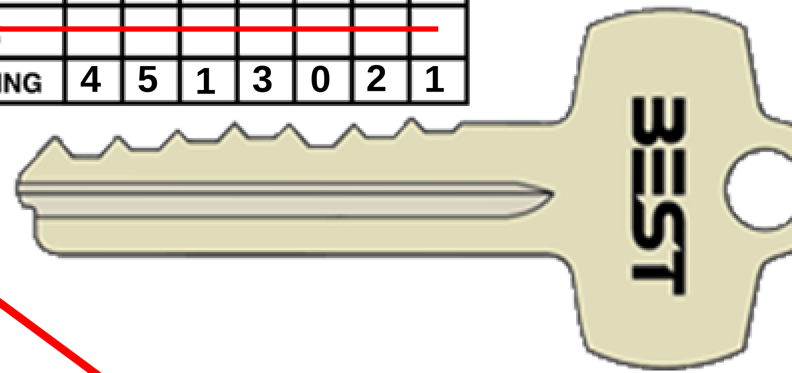
Add 6 to each cut of the **Control** Key and record the numbers on the chart.

*Example: If the first cut of the Control Key is **3**, the Control Number for the first barrel will be **9** (6 is added to the Control Key cuts to compensate for the thickness of the control lug, which is six "increments" thick).*

Forgetting this step is the cause of many combinating problems.

Record the **Grand Master**, **Master**, and **Individual Operating Key** on the appropriate lines on the chart.

Barrel #	1	2	3	4	5	6	7
TOTAL STACK	14	14	14	14	14	14	14
CONTROL	9	8	11	10	6	7	8
GRAND MASTER	2	0	3	1	5	4	4
~~MASTER~~							
~~SUB MASTER~~							
IND. OPERATING	4	5	1	3	0	2	1



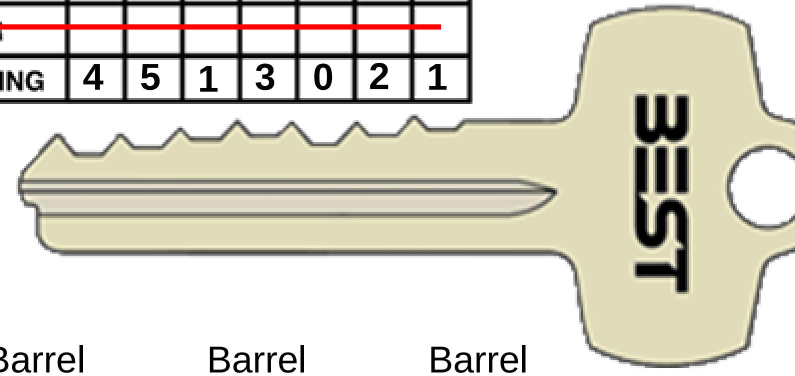
Sample Keys:

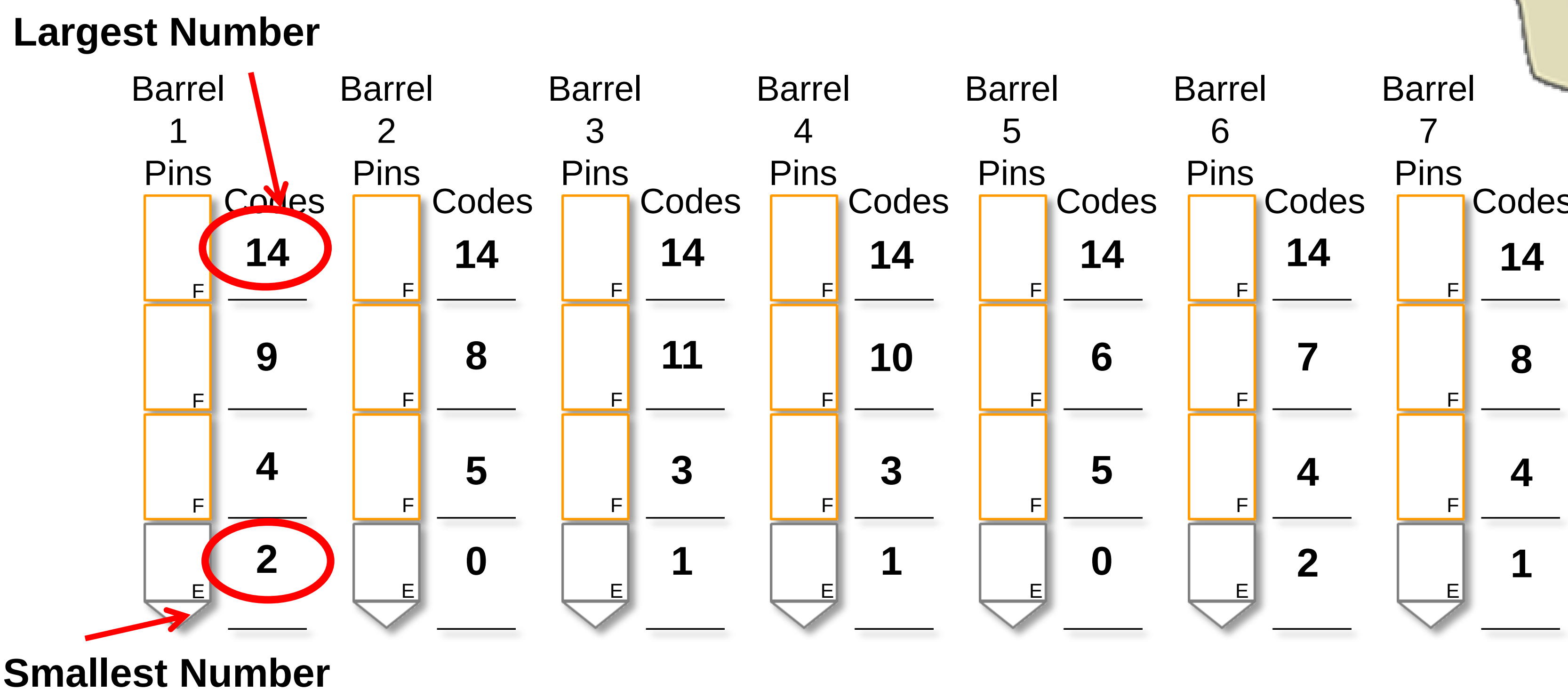
CONTROL	3254012
GRAND MASTER	2031544
MASTER	4513024
INDIVIDUAL OPERATING	4513021

It is **NOT** necessary to enter any master-level keys other than the GM. They will automatically work.

The codes from each barrel are entered into the chart below, in ascending order *(Smallest code at the bottom; Total Stack at the top).*

Barrel #	1	2	3	4	5	6	7
TOTAL STACK	14	14	14	14	14	14	14
CONTROL	9	8	11	10	6	7	8
GRAND MASTER	2	0	3	1	5	4	4
~~MASTER~~							
~~SUB MASTER~~							
IND. OPERATING	4	5	1	3	0	2	1





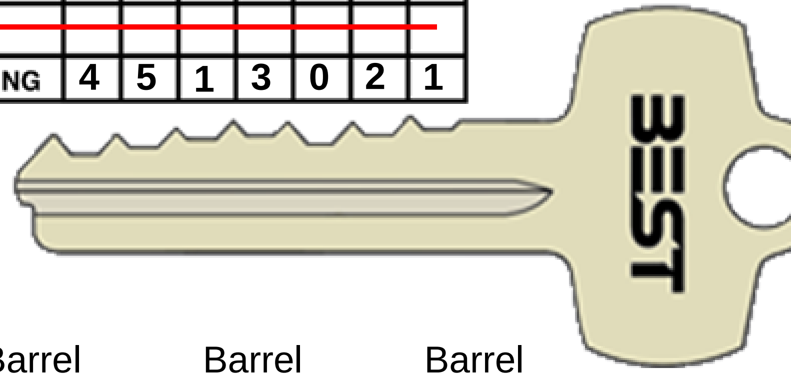
The smallest code number is always the “E” pin segment. It goes in the “E” box in the Pin Segments column.

In this example the 1st “F” **code** is 4. To find the find 1st “F” **pin segment** subtract the “E” code (2) from the 1st “F” code (4). The difference is 2 and it is entered into the chart as a 2 pin segment.

To find the 2nd “F” pin segment, subtract the 1st “F” code from the 2nd “F” code and enter difference into the chart.

To find the 3rd “F” pin segment, repeat the previous pattern.

Barrel #	1	2	3	4	5	6	7
TOTAL STACK	14	14	14	14	14	14	14
CONTROL	9	8	11	10	6	7	8
GRAND MASTER	2	0	3	1	5	4	4
~~MASTER~~							
~~SUB MASTER~~							
IND. OPERATING	4	5	1	3	0	2	1



Barrel 1 Pins	Codes	Barrel 2 Pins	Codes	Barrel 3 Pins	Codes	Barrel 4 Pins	Codes	Barrel 5 Pins	Codes	Barrel 6 Pins	Codes	Barrel 7 Pins	Codes
5 F	14	6 F	14	3 F	14	4 F	14	8 F	14	7 F	14	6 F	14
5 F	9	3 F	8	8 F	11	7 F	10	1 F	6	3 F	7	4 F	8
2 F	4	5 F	5	2 F	3	2 F	3	5 F	5	2 F	4	3 F	4
2 E	2	0 E	0	1 E	1	1 E	1	0 E	0	2 E	2	1 E	1

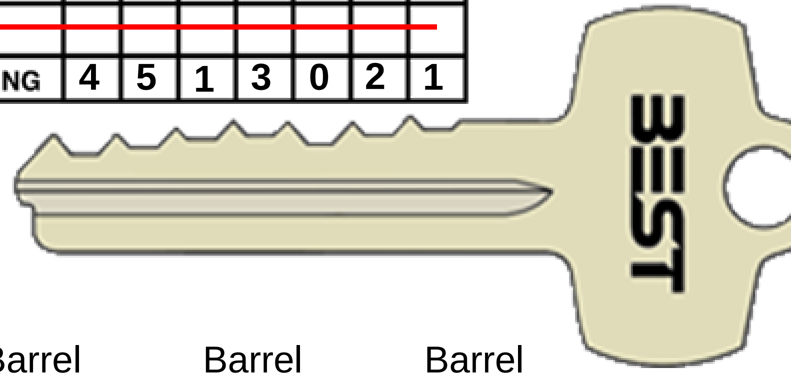
Put lines through the code columns so that you do not confuse them with the pin segment columns.

Starting with the "E" pin segment and ending with the 3rd "F" pin segment, load all pin segments into each barrel.

Start with barrel 1 and finish with barrel 7 (barrel six in a 6-pin system).

Complete and test each barrel before moving to the next.

Barrel #	1	2	3	4	5	6	7
TOTAL STACK	14	14	14	14	14	14	14
CONTROL	9	8	11	10	6	7	8
GRAND MASTER	2	0	3	1	5	4	4
~~MASTER~~							
~~SUB MASTER~~							
IND. OPERATING	4	5	1	3	0	2	1



Barrel 1 Pins	Codes	Barrel 2 Pins	Codes	Barrel 3 Pins	Codes	Barrel 4 Pins	Codes	Barrel 5 Pins	Codes	Barrel 6 Pins	Codes	Barrel 7 Pins	Codes
5 F	14	6 F	14	3 F	14	4 F	14	8 F	14	7 F	14	6 F	14
5 F	9	3 F	8	8 F	11	7 F	10	1 F	6	3 F	7	4 F	8
2 F	4	5 F	5	2 F	3	2 F	3	5 F	5	2 F	4	3 F	4
2 E	2	0 E	0	1 E	1	1 E	1	0 E	0	2 E	2	1 E	1

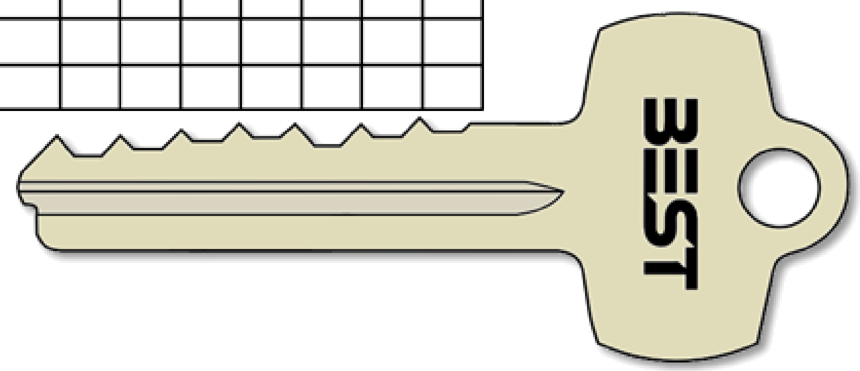
IMPORTANT POINTS TO REMEMBER

- Barrel 1 is at the back of the core.
- Barrel 7 (or 6) is at the face of the core.
- Always start at barrel 1 and work toward barrel 7 (or 6).
- Load one barrel completely before moving to the next.
- “A” pins are inserted with the point down.
- “B” pin segments are the same on both ends and can be inserted either way.
- Only use original BEST pin segments.
- Springs are loaded after all pin segments are loaded into the barrels.
- Test the Control Key and all Operating Keys in every core.
- Cores can be lubricated with graphite, LPS1 or Corrosion Free Formula 8000
    - Do not mix lubricants, especially wet graphite and spray lubricant

A4 Key System

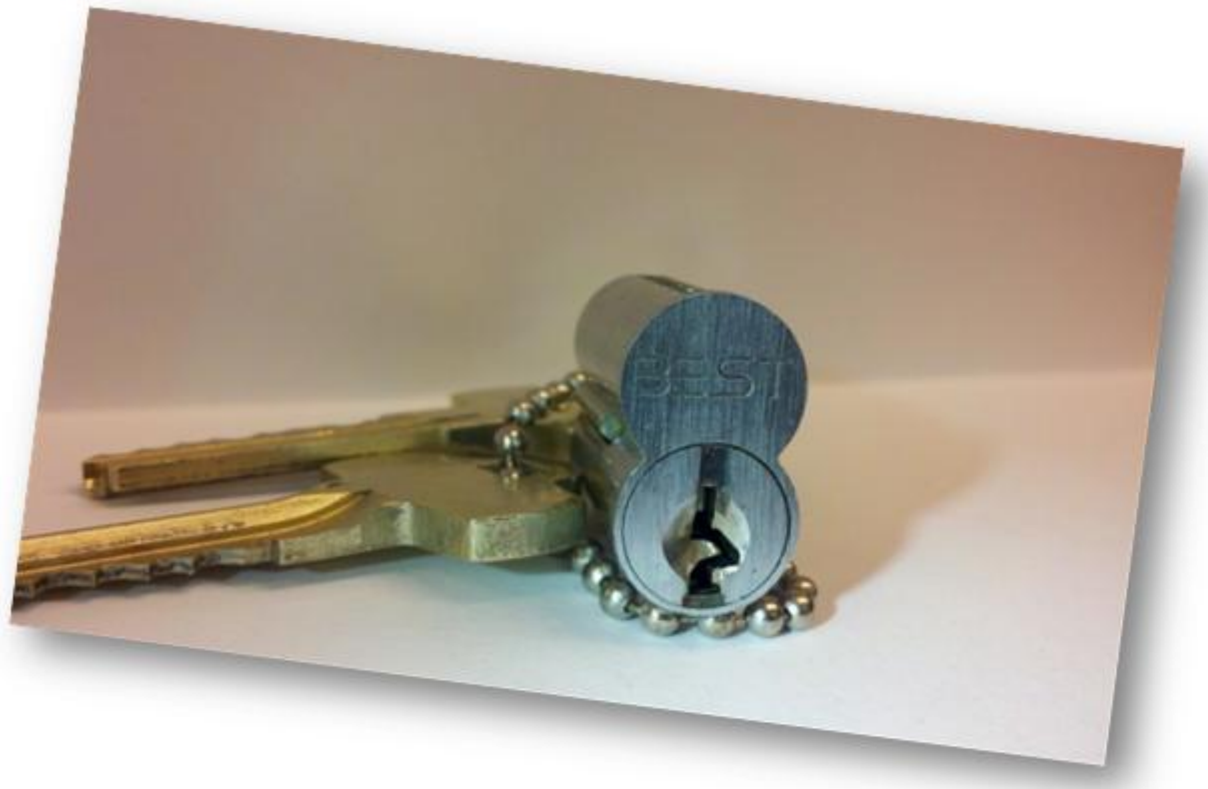
Coremark ______

Barrel #	1	2	3	4	5	6	7
Total Stack	14	14	14	14	14	14	14
Control (+ 6)							
GM							
Master							
Sub-master							
Operating							
Operating							
Operating							
Operating							



Barrel 1		Barrel 2		Barrel 3		Barrel 4		Barrel 5		Barrel 6		Barrel 7	
Pins	Codes	Pins	Codes	Pins	Codes	Pins	Codes	Pins	Codes	Pins	Codes	Pins	Codes
F	______	F	______	F	______	F	______	F	______	F	______	F	______
F	______	F	______	F	______	F	______	F	______	F	______	F	______
F	______	F	______	F	______	F	______	F	______	F	______	F	______
E	______	E	______	E	______	E	______	E	______	E	______	E	______

Troubleshooting

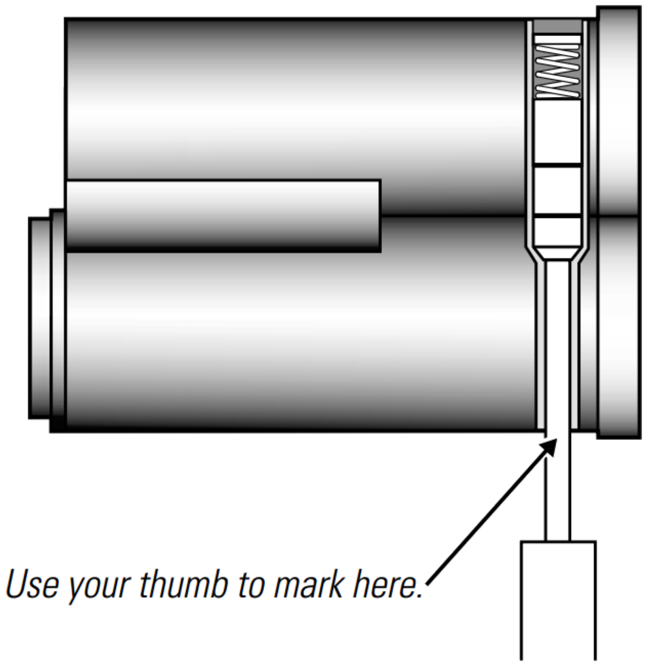


Possible Reasons for Keys Not Operating a Core

- Keys have been cut to the incorrect depths
- Key Combinator needs to be calibrated
- Key was “duplicated” on a rotary key duplicator instead an original key being generated on a BEST “punch” cutter
- The initial “index” pull of the BEST Key Combinator handle was forgotten leaving the key one cut short
- Incorrect pins were dropped into the core
- The core was pinned from front to back instead of back to front
- Bottom pins were inserted upside down (pointed end upward)
- Too few or too many pins per barrel
- Stack Height exceeding the system specifications
- Key not fully inserted in the core
- Damaged core or key
- Extremely worn pins in the core from many years of hard use
- Old lubrication has dried out and solidified
- Foreign object is blocking the key from fully entering the keyway

Thumb Check Procedure

If the core does not operate, first check the key for proper key cut depths. Then, before ejecting the pins, use the Thumb Check Procedure to check for incorrect stack heights caused by incorrect pin lengths or too few or too many pins per barrel.



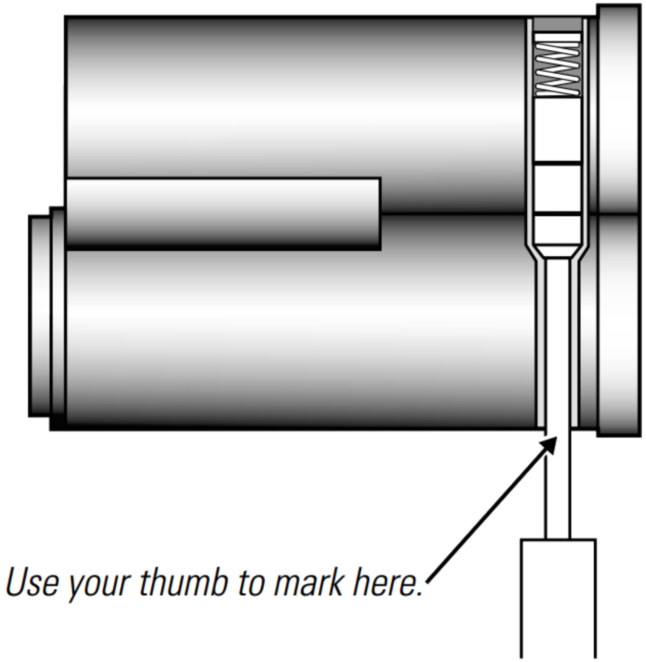
Thumb Check Procedure

Insert the Ejector Pin into an Ejector Hole and push until the spring is fully compressed.

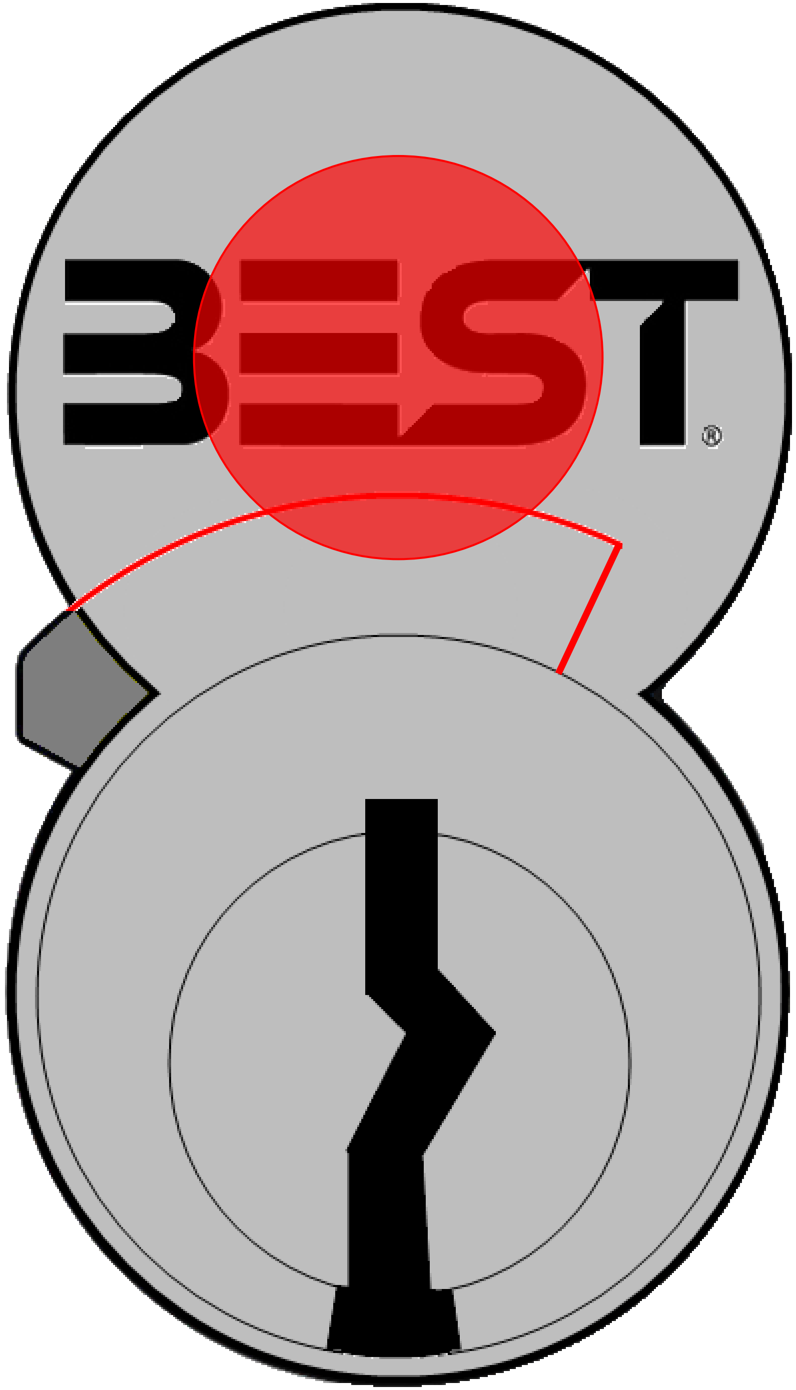
Use your thumb to mark the depth on the ejector pin. Keep your thumb in place.

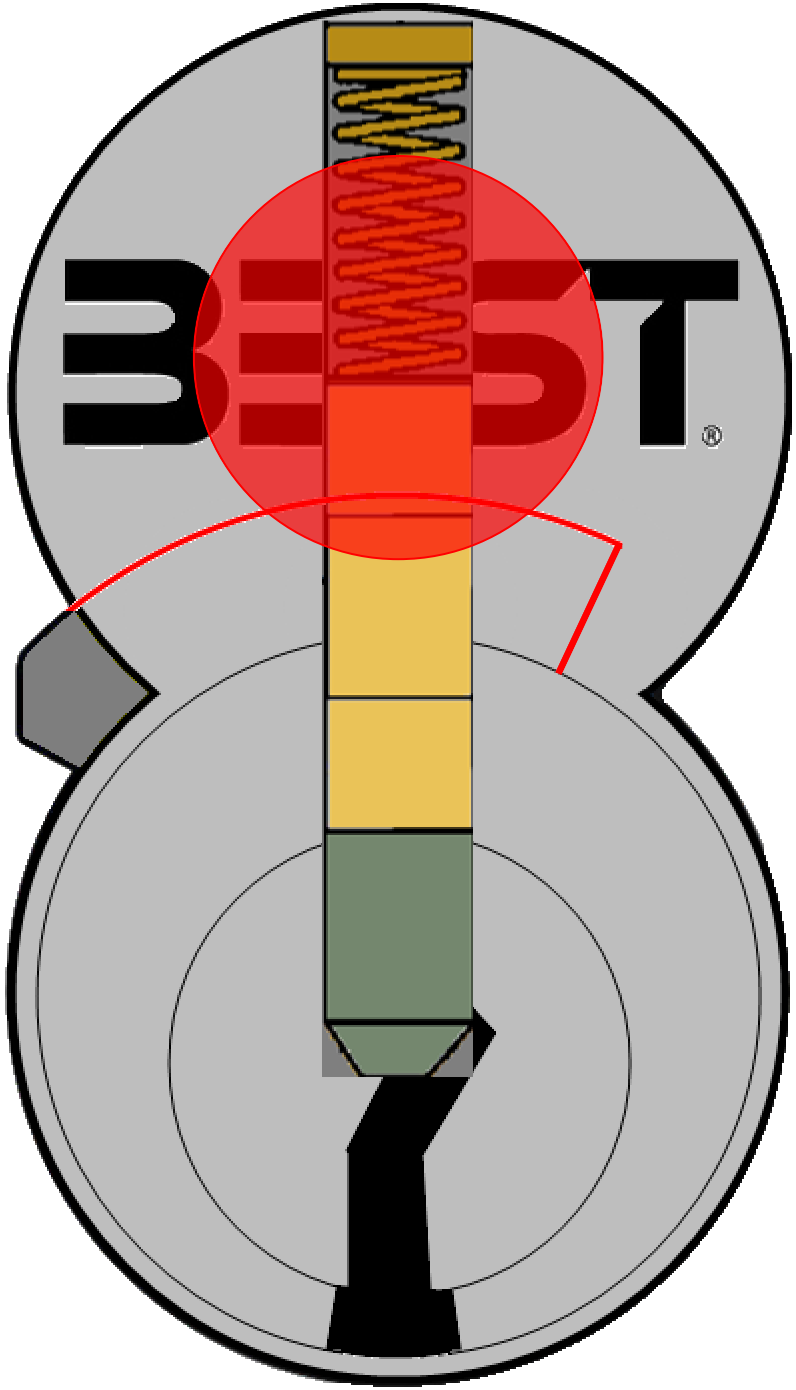
Insert the pin into the other ejector holes. If the pin segment stack height varies, use the ejector pin to force out the segments, springs, and caps of the barrels that are incorrectly loaded.

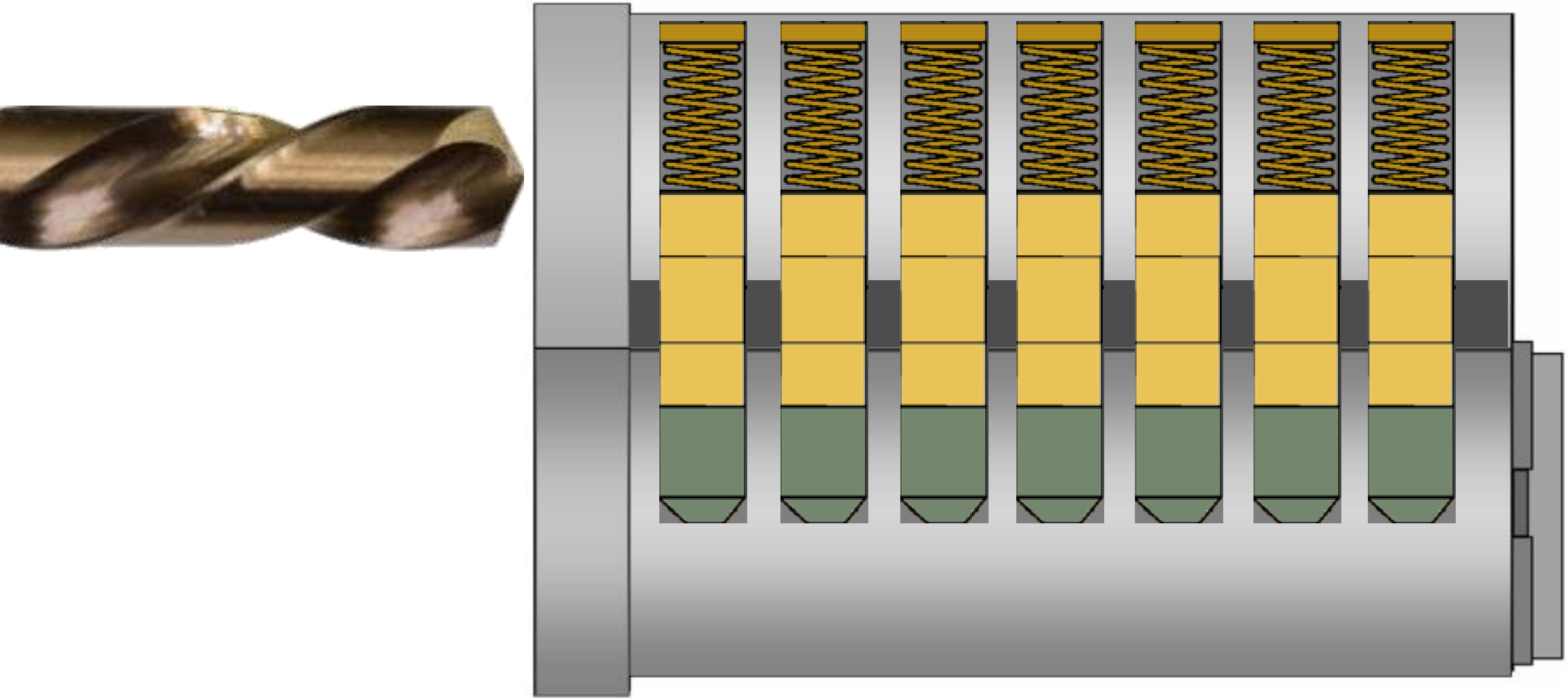
Discard the used segments, springs, and caps. Reload the barrels with correct pin segments, springs, and caps.

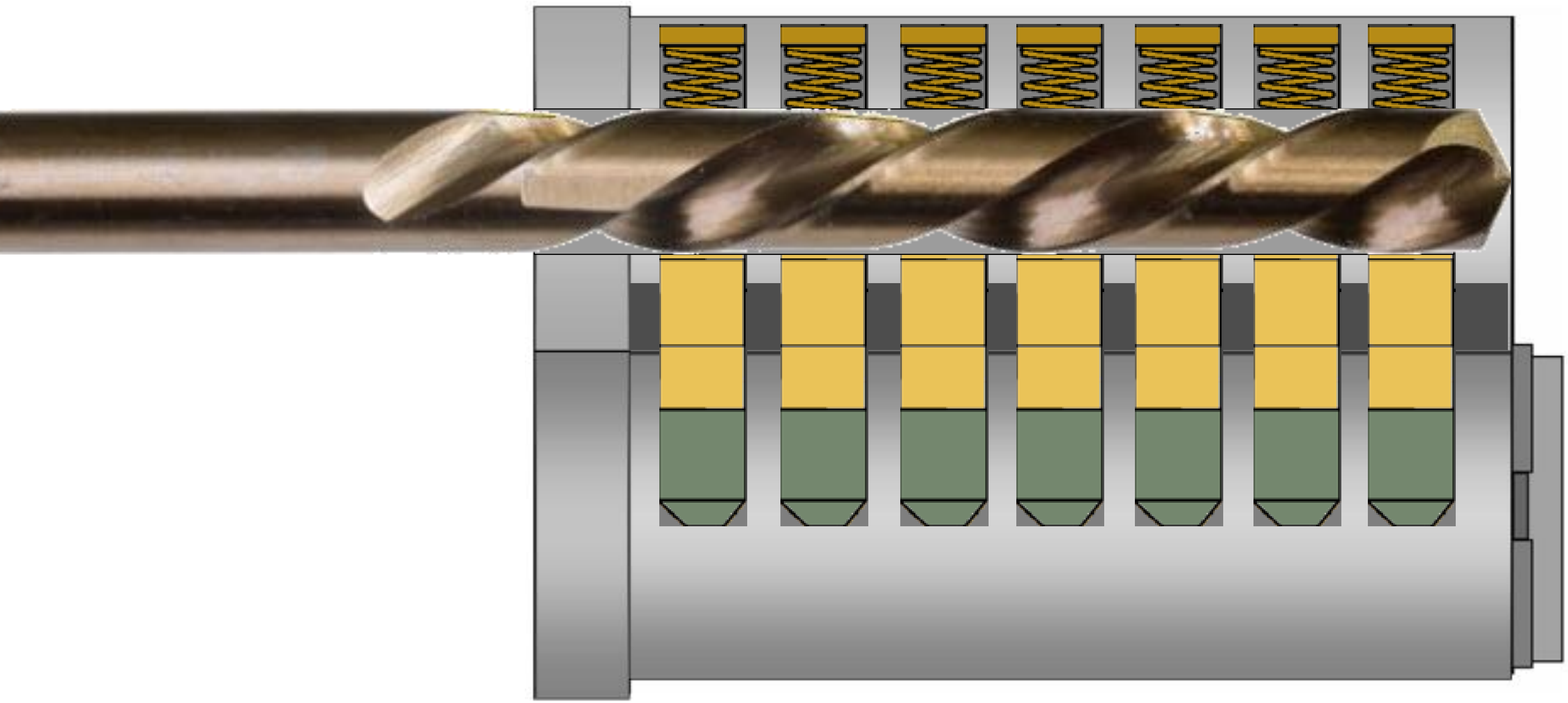


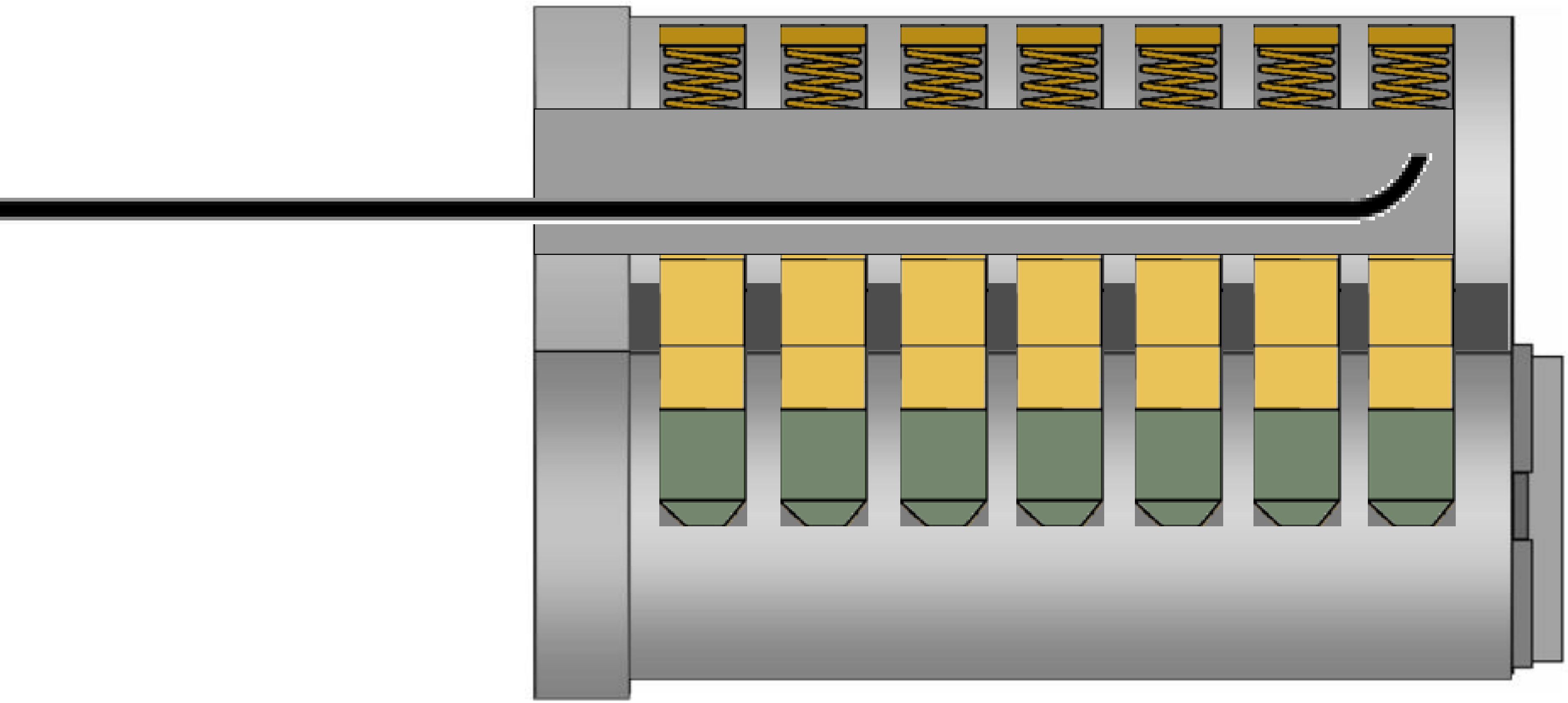

BEST®

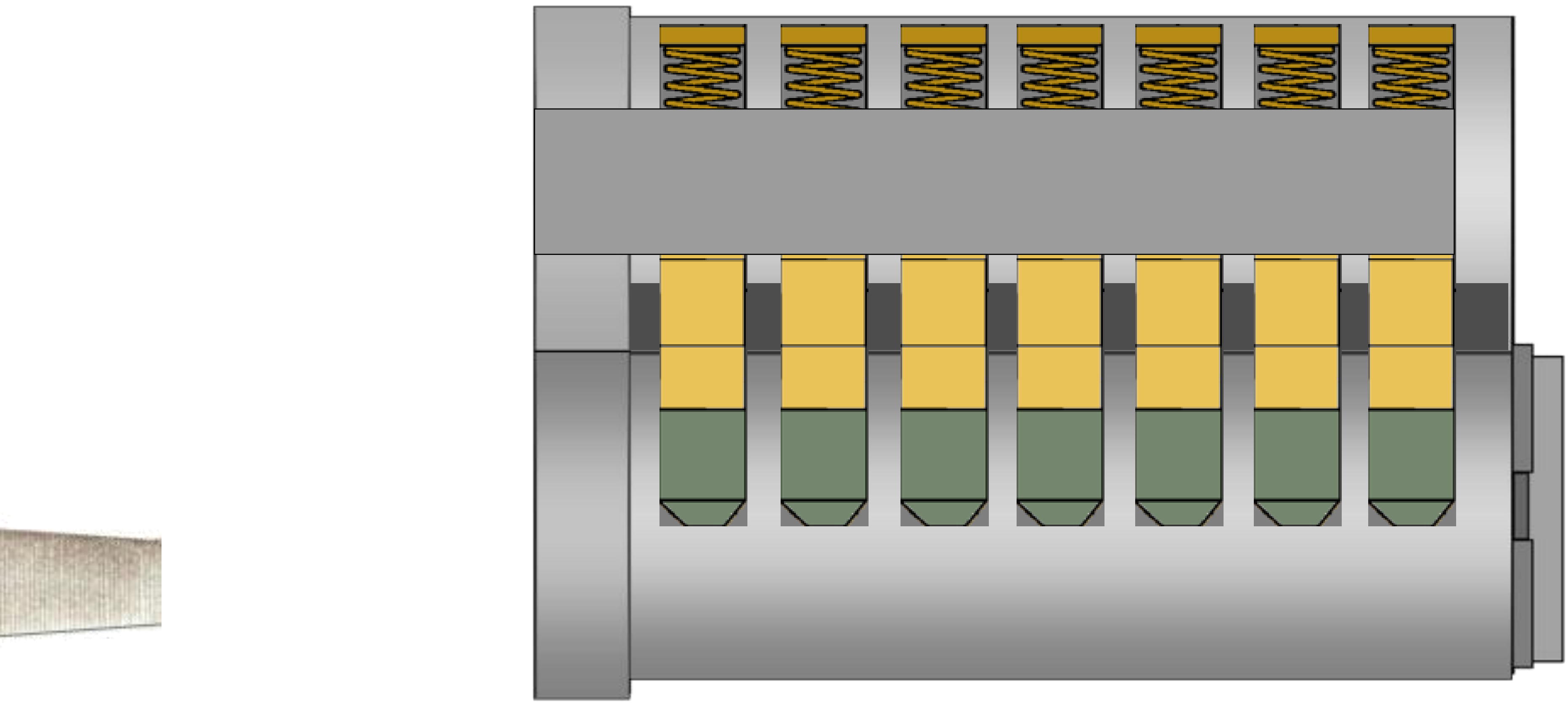

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